2/7/80
Bill McKee gave to me.

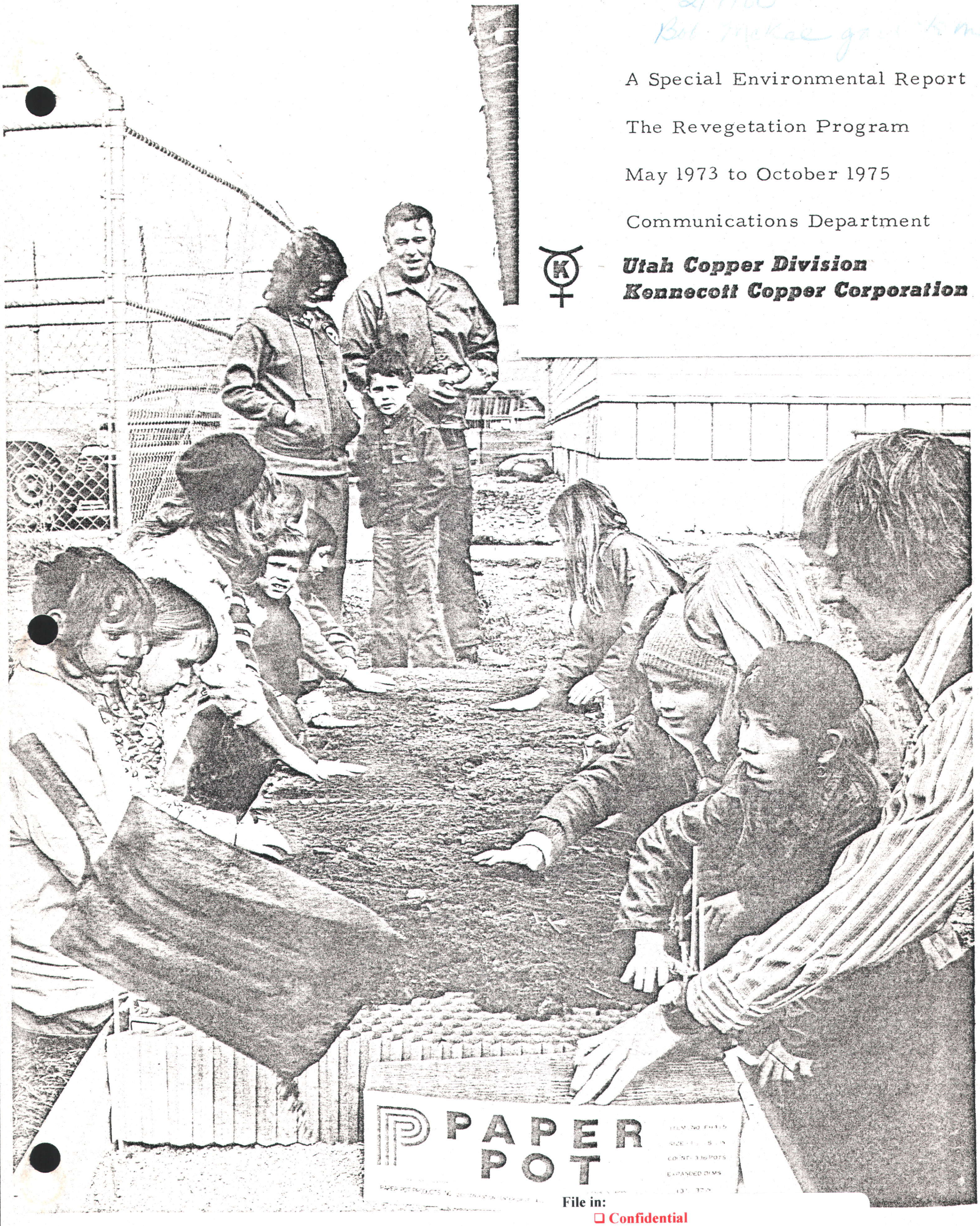
A Special Environmental Report

The Revegetation Program

May 1973 to October 1975

Communications Department

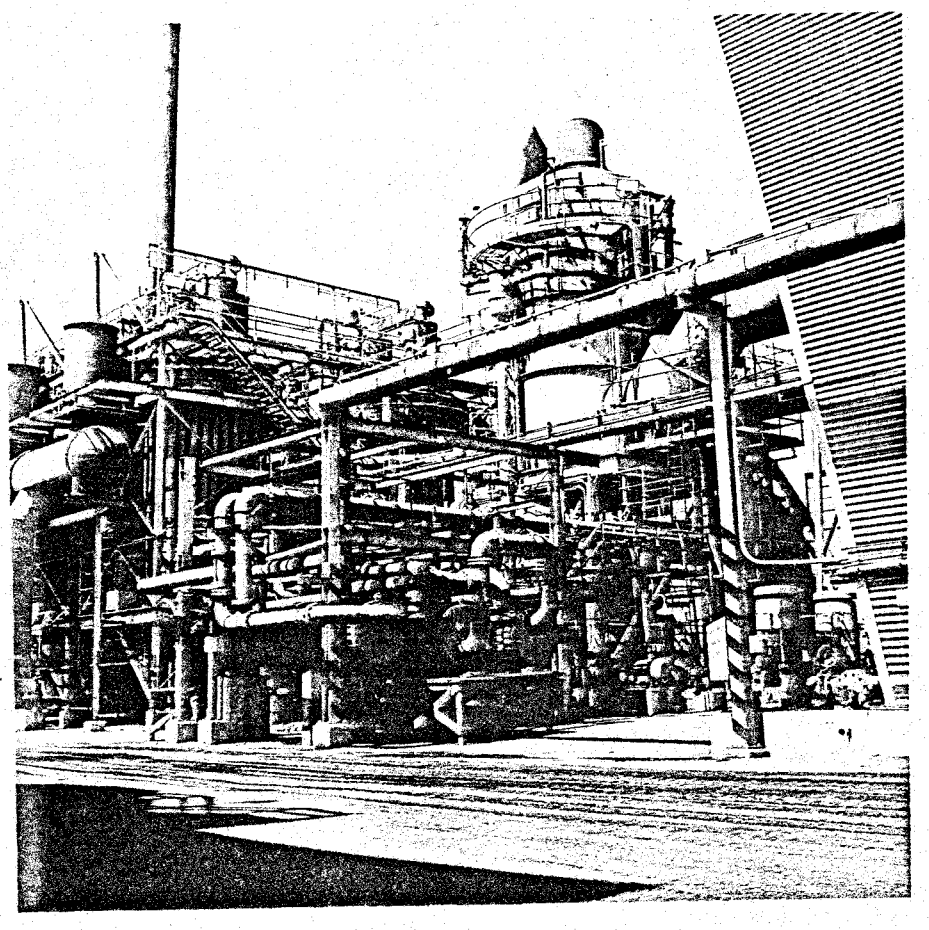
Utah Copper Division
Kennecott Copper Corporation



FOREWORD

The following chronology, with exhibits, details the development of Utah Copper Division's Revegetation Program, outlines the basic projects, and anticipates the expansion of activities. Revegetation is now practical because enough sulfur oxides have been removed from the stack plume to enable natural plant growth to return. This has been done through the development of sulfuric acid plants, designed to remove sulfur compounds from the process gases.

A SULFURIC ACID PLANT



BACKGROUND

The north end of the Oquirrh Mountain Range, location of several Utah Copper Division plants (smelter, refinery, concentrators, power plant and others) had been subjected to logging operations, overgrazing and fire--both made-made and natural--long before the smelter was built during the opening decade of the Twentieth Century. Early smelter fumes added the coup de grace.

When Kennecott purchased the smelter in 1959, the north Oquirrhs were to a large extent devoid of vegetation. With the addition to the smelter operations of more sulfuric acid plants designed to remove sulfur oxides from the process gases, the native vegetation began to return, slowly at first, but more and more rapidly as greater quantities of sulfur were removed from the stack emissions.

Accompanying this air quality improvement--an EPA study indicated a 4-fold decrease in sulfur dioxide concentration in Magna between 1940 and 1971--a program of species testing was initiated in the canyons near the smelter as ecologist Paul Rokich began doing experimental planting, first under Dr. Walter P. Cottam at the University of Utah, then under Dr. Kimball Harper now at Brigham Young University. Rokich can document the opening operation of each new sulfuric acid plant with the return of native flora. The latest acid plant went on line in 1970.

In May 1973 Dr. Robert J. Heaney, head of Utah Copper Division's environmental section since its inception in 1959, hired Rokich as an environmental technician and teamed him with forester Larry Jones, who holds degrees from Purdue University and Michigan Technological University. Together they have developed a multi-faceted division-wide program of dust and erosion control, watershed protection and flood prevention, habitat improvement and landscaping. That program is the subject of this special report.

Exhibit I

THE FIRST SUMMER

Hired in May, Rokich and Jones were hardly organized before the best part of the planting season was over. Full-blown summer had arrived before they got their seed into the ground. Planting in less-than-ideal conditions just to get the program underway, they drilled two acres of the tailing pond with Japanese millet, landscaped the plant site around the Bonneville crusher plant and drilled the area with a special grass mixture, and drilled seven miles of the tailing dike with grasses. They planted trees and shrubs, even garden vegetables and fruit trees to prove that even such delicate plants would grow in the improved environment.

The various projects created enthusiasm among plant workers, and as the team dressed up the properties, employees began to take greater pride in their surroundings, keeping the areas clean and protecting the plantings, even watering them and encouraging Paul and Larry to do more.

The October 1973 issue of Kennescope, published by the Communications Department, Utah Copper Division, provides background on the program in its first year, but stresses the fact that the research upon which the program is based goes back many years. Photographs accompanying the article show some of the early experimental plantings as well as the tree nursery and the Japanese millet planted in the summer of 1973.

Kennescope

Published by
Kennecott Copper Corporation
Utah Copper Division
P.O. Box 11299
Salt Lake City, Utah 84111

No. 147 October, 1973

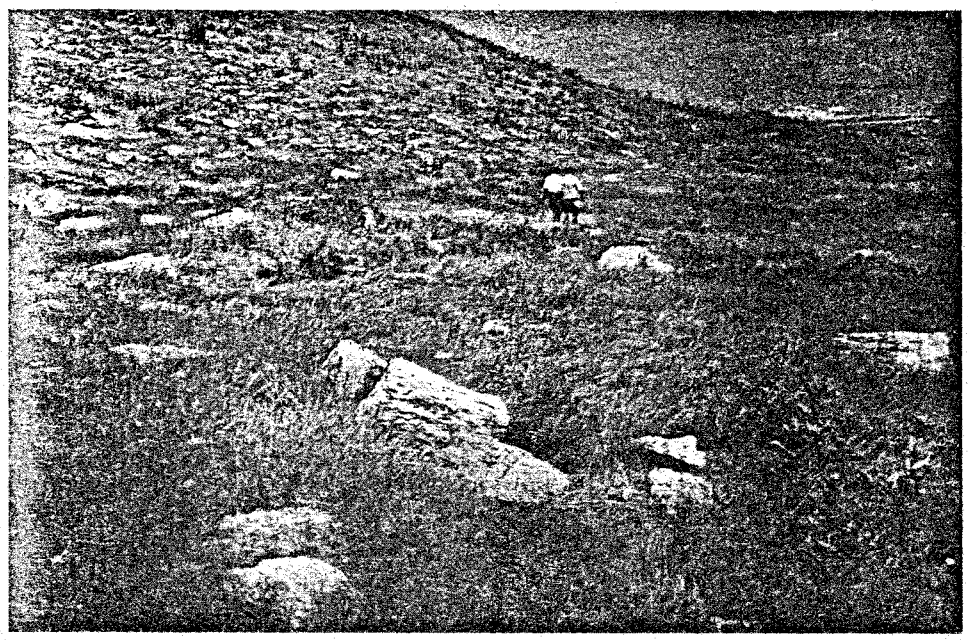
New vegetation abounds in 'dead' Oquirrhs

THERE WASN'T a jackrabbit in Black Rock Canyon when Paul Rokich began experimental plantings there in 1957.

Black Rock Canyon is a steep ravine directly above Black Rock Resort on Great Salt Lake west of the smelter. Due to a variety of reasons, its vegetation was limited and there was almost no animal life.

But since then the Oquirrhs have been making a quiet, almost unnoticed comeback. Experts attribute it mainly to better land man-

Continued on page 4

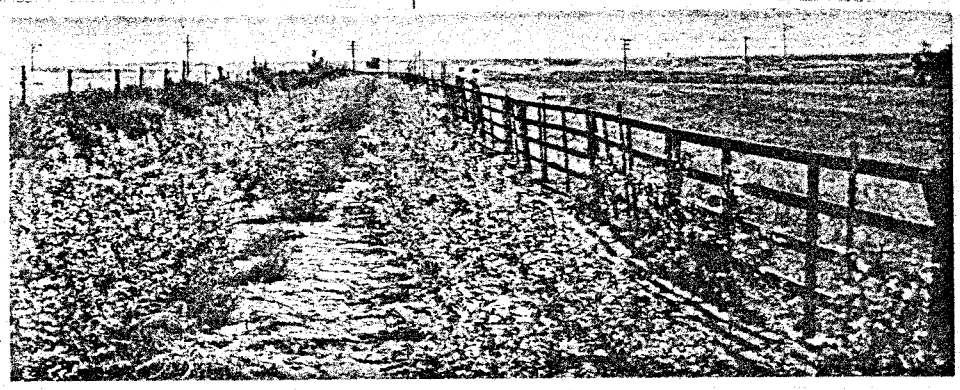


Division vegetation experts Paul Rokich and Larry Jones inspect new vegetation growth in Black Rock Canyon. Lush grasses reflect environment change in Oquirrhs.

Paul Rokich and his sure-footed friend Blackjack travel the Oquirrhs together.

Larry Jones, field inspector, examines experimental growth on tailing pond.

Mr. Rokich shows that even apple trees can survive, thrive above the smelter.



Several varieties of trees are being started in this Kennecott tree nursery in Tooele County. They will be transplanted to appropriate sites on company property.

Another premature obituary

'Dead' Oquirrhs yield new growth

Continued from page 1

agement, reduced emissions and the revegetation efforts of Paul Rokich.

Plant and animal life in the area reflect the change. Black Rock Canyon and surrounding range in the Oquirrhs now provide a home for deer, rabbits, partridge and many other wild species. Within a few years a vast change has taken place.

The canyon is again becoming covered with protective foliage, much of which Mr. Rokich introduced.

A life-long Garfield and Magna resident, Paul Rokich had always wanted to "put the trees back on that old hill." He began privately in the 1950s.

"When I first started revegetating the area, people thought I was crazy," Mr. Rokich says. "At first, not everything grew." Now, many of his experimental plantings are spreading beyond his neat rows and sample plots, scattering vegetation throughout the north Oquirrhs.

Mr. Rokich worked cooperatively with Kennecott since he began planting and seeding 15 years ago, though at first he received no support or assistance, just permission to conduct his experimentation on company property. However, the company watched his efforts with interest and recently he was hired as an environmental technician.

On the job, Mr. Rokich assists Larry Jones, field inspector, process control and environmental section, headed by Dr. R. J. Heaney, in solving some tough vegetation problems. Presently they are formulating a comprehensive land improvement program for the division, including seeding, revegetation, terrain beautification, tailing stabilization, erosion control and other specific control programs.

The pair is using Black Rock Canyon experiments as guidelines for trial plantings elsewhere in the division. They have started an experimental tree farm on Kennecott property in Tooele County where they are studying several varieties of trees to determine which are suitable for various parts of the division.

Mr. Jones, a graduate of Purdue and Michigan Technological University, a specialist in growing vegetation on tailings, has initiated trial plantings of fast-growing grass on the sandy surface of the tailing pond. Grass in the experimental plot has done well. Mr. Jones and Mr. Rokich feel that vegetation of this type may be an effective and economic tailing surface stabilizer in the future.

Also at the tailing pond, the pair is conducting experimental plantings of various types with a goal of solving seepage and stabilization problems on the dike.

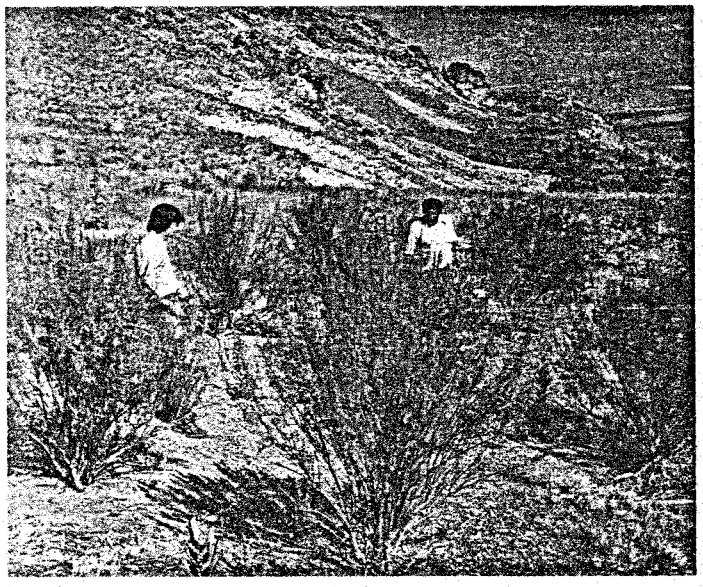
At the Bonneville concentrator, they have been grooming the terrain and planting varieties of crested wheatgrass in efforts to provide a suitable cover with low susceptibility to fire during the critical late summer period.

They are also conducting test plantings of various shrubs and trees at the concentrators.

Until now the work has been primarily for research, using rented or borrowed equipment or manual methods. Most plantings have been in limited areas, though some major grass planting has been done.

Based on their 1973 results, and continued research, the ecologists' comprehensive land reclamation and revegetation plan will involve more sophisticated methods, and should eventually affect the management of much of the division's property.

Larry Jones, left, and Paul Rokich examine large Russian olive tree that Mr. Rokich planted in Black Rock Canyon in 1958.



This thriving trial plot of European sage was planted by Paul Rokich several years ago in the mountains above the smelter.

Exhibit II

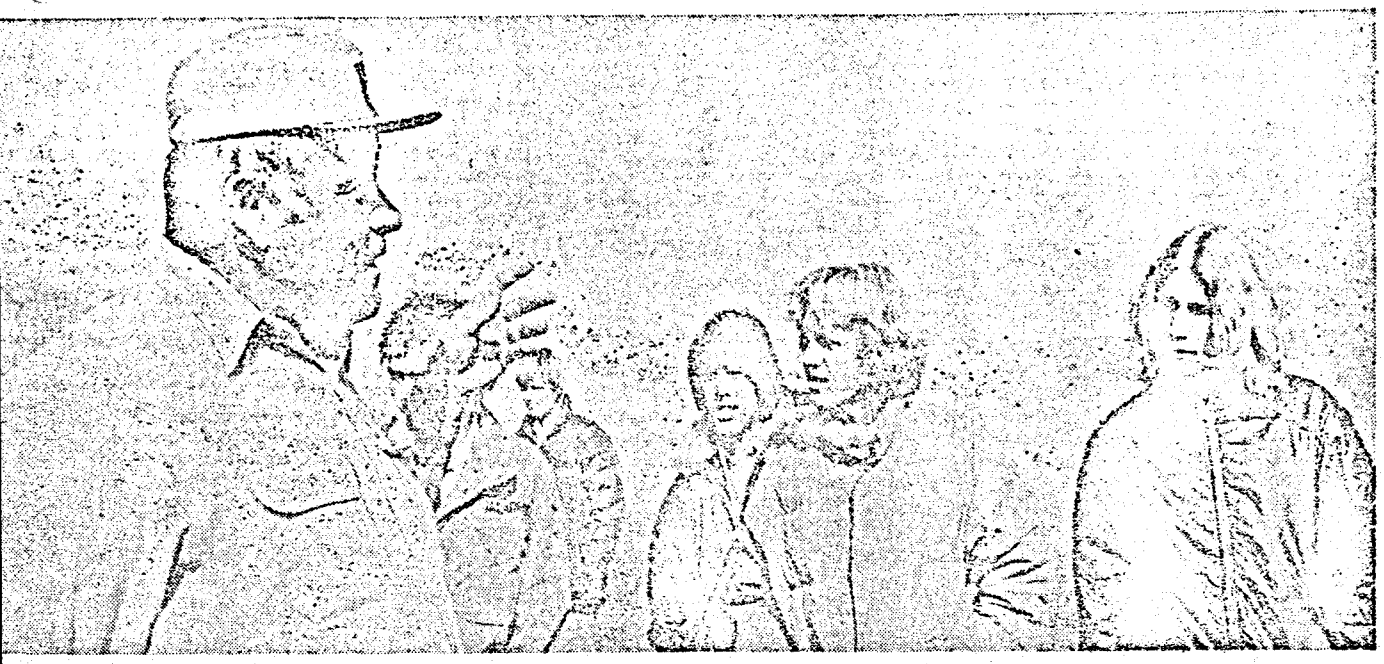
BRIGHTON HIGH SCHOOL STUDENTS

The revegetation team, asked to speak to a group of students in a highly involved persons (HIP) class at Brighton High School, so fired the imagination of the group, that they asked for an opportunity to "help Paul plant his mountain."

On several occasions during the fall and winter of 1973 the students planted trees and shrubs in Little Valley, Kessler Canyon and Coon Canyon. A Deseret News reporter accompanied the students on one such outing and filed a story in which she referred to Rokich as "Utah's Johnny Appleseed." The story appeared with photographs in the November 7, 1973 Deseret News.

The HIP students from Brighton, under the guidance of teacher Jeff Metcalf, were honored with a cook-out in Coon Canyon on Arbor Day (April 26, 1974) and presented with ceryificates of appreciation. Thirty-seven students received certificates that day and seventeen more, who participated in the program for the first time that day--when students planted trees on the railroad embankment at Bonneville--received identical certificates at the end-of-school awards assembly.

Media coverage included a KCPX (Channel 4) TV spot on the late-afternoon and on the evening news April 26, 1974.



On his own, Paul Rokich has been trying to reseed the Oquirrhs for 13 years. Now he has begun receiving help from local students, like these from Brighton High, and has just been hired by Kennecott as an environmental technician.

Utah's Johnny Appleseed

Linda Tyler, left, and Pat Rosenlund team up to plant White Fir trees in Kesler Canyon.

By Sue Thurman
Deseret News staff writer

As the old cattle truck groaned up the rutted canyon trail it took a lot of hard imagining for anyone to believe this was luxury.

But Paul Rokich was adamant. "Why, when I first started planting trees up here I'd park on Highway 40, load the seedlings on my back and hike for six hours. One time I even pulled them in my son's wagon.

"And this was at 3:30 in the morning! Why this cattle truck is pure luxury."

Paul Rokich is a modern-day Johnny Appleseed, who for the past 13 years has been reseeding the Oquirrh hills.

Many thought he was crazy, but he had a dream, and he wasn't about to give up.

"When I was knee-high to my father I knew I would plant trees in the area," said Paul. "I've been offered jobs all over the United States . . . but I'd never leave . . . I have a job to do here."

And now, this year, after conducting experimental plantings of Black Rock Canyon on his own since 1959, Paul was hired by Kennecott Copper as an environmental technician.

Paul, who was born in Smelter Camp, Utah (now nonexistent) has spent his entire life roaming the hills of Black Rock and Kesler Canyons. In his younger years he was a cowboy herding cattle on the mountain.

He remembers August of 1947 when there was a big fire in Black Rock Canyon.

"They used my horse, Nig, to carry supplies into the fire zone," said Paul "He was lost in that fire.

"And as I looked upon the desolate sight I knew I'd see trees there again."

Apparently a variety of forces combined to strip the mountain of its foliage. Johnston's Army, which had a sawmill in the canyon, cut a lot of trees for their buildings. Early pioneers used timber for houses and farms.

Heavy grazing, the fire and pollution from Kennecott smelters all combined to destroy plant life.

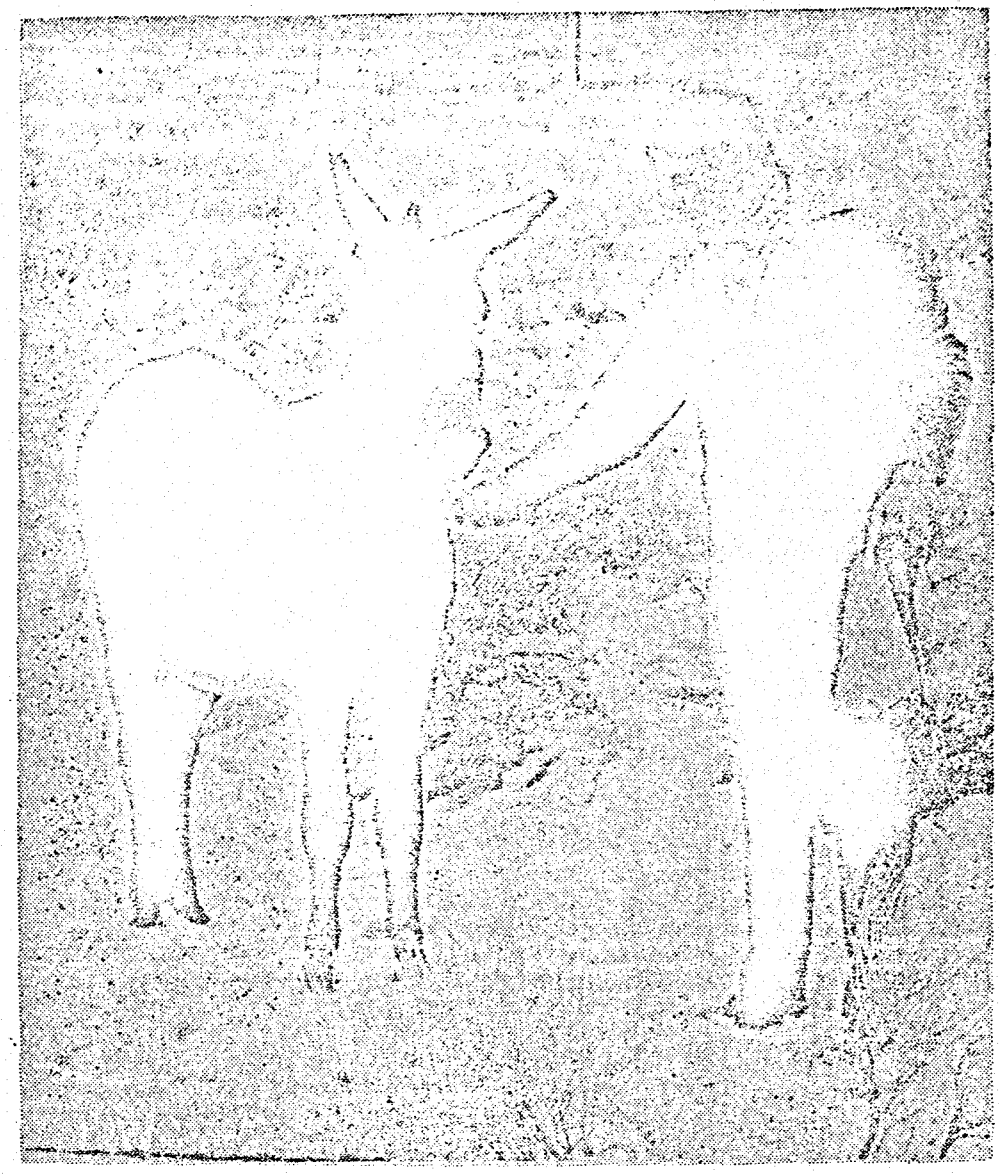
"But now emissions are low enough to attempt reseeding," said Paul.

He has introduced over 50 new species of grass, trees and shrubs in the area.

"People thought I was crazy when I first started planting," said Paul. "They were sure nothing would grow!"

But now there are Russian olive trees, wheat grass, elderberries, maple trees, mountain mahogany, European sage, sunflowers, iris, sego lilies, fruit trees, alfalfa, bitter bush, bluebells, Indian paint brush and many other forms of vegetation.

(over)



With his mule "Black Jack," Paul has made many trips up the mountain to plant seedlings. "I just devoted my life to this goal," he says.

Even the animals are back.

"Elk, coyotes, eagles, rabbits — every animal known to this country," said Paul. "It's completely changed in the last 13 years.

"In fact, in the last six years it's exploded so fast even I can't keep track of all the vegetation and animals.

Although the area has been making a quiet, almost unnoticeable comeback the struggle hasn't been easy.

For many years NOTHING would grow. And nobody gave Paul the trees to plant those first 13 years.

Paul worked heavy construction during the day to earn enough money to purchase the trees. This tree-planting business was a sideline he pursued in the middle of the night.

"I just devoted my life to this goal," said Paul. "Rather than go bowling I'd buy a tree."

But Paul's family (a wife and three children) never seemed to mind. As Paul puts it — "They're my greatest supporters!"

After a time of strapping seedlings to his back Paul decided to buy a mule for that purpose. Black Jack was purchased from the county pound for $25. The bidding started at a quarter.

However, Paul now feels the country's too rugged for his burrow. Black Jack enjoys a fine pasture off the old 21st South highway.

Lately, Paul has begun receiving assistance from local students, and hopes soon to take Boy Scouts with him on his planting expeditions.

Although Paul now travels "first-class" up the canyon (in a truck), his ideas concerning ecology haven't changed much. He still envisions lush green fir trees and pines thriving on the rocky peaks behind Kennecott.

Jeff Metcalf, HIP teacher at Brighton High School, helps load a truck with tools and trees at the division's tree farm on the west side of the Oquirrh Mountains as part of the revegetation program.

HIP students from Brighton High School plant trees on Kennecott properties.

To screen a railroad fill Brighton High School students plant Russian olive trees on Arbor Day--1974

Planting trees on Arbor Day, Brighton High School students attack a harsh growing site.

The Utah Copper Division
Kennecott Copper Corporation
pays grateful tribute to

_____

for dedicated involvement in the
revegetation of the Oquirrh Mountains.

Arbor Day, 1974

_____
GENERAL MANAGER

_____
ENVIRONMENTAL TECHNICIAN

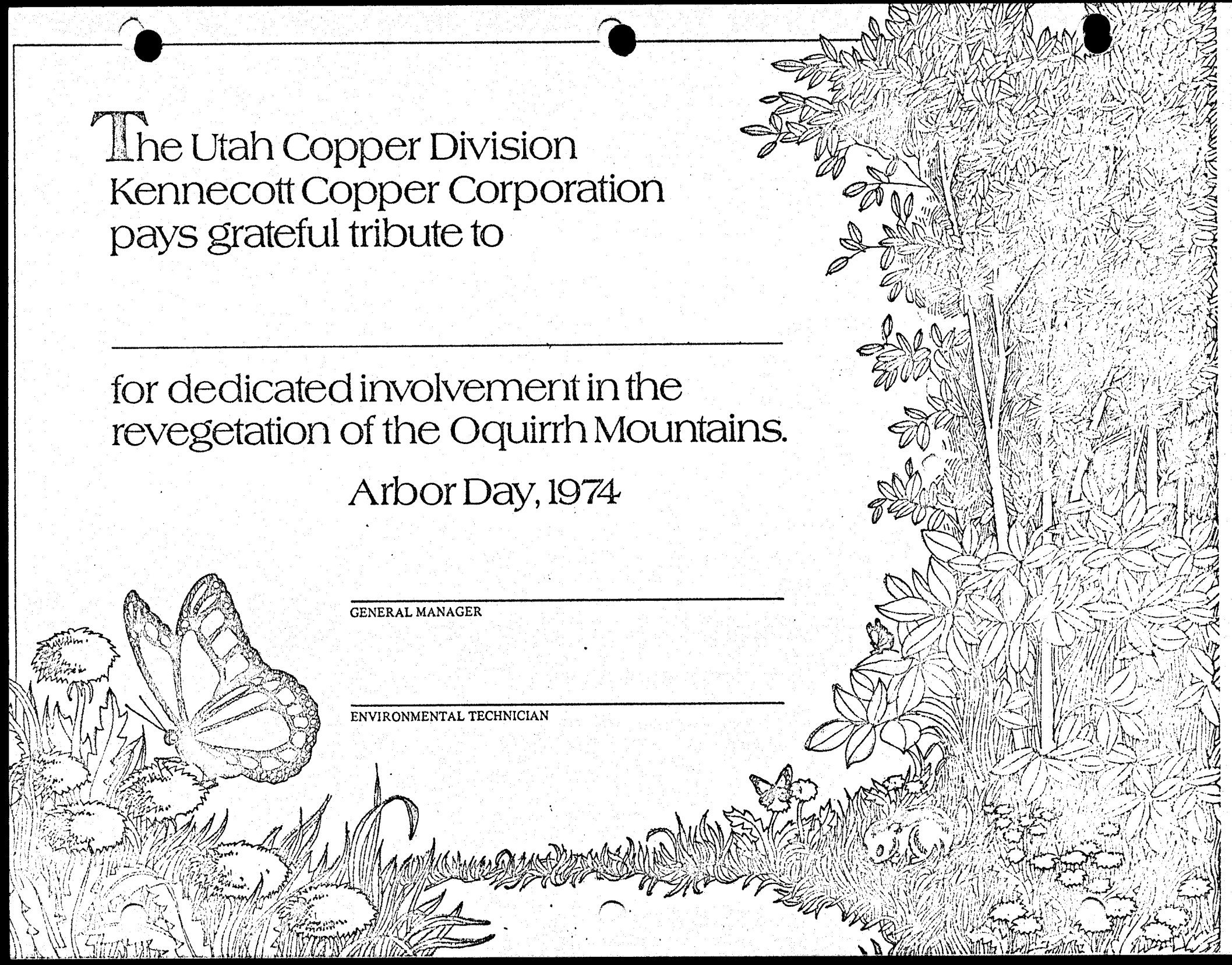


Exhibit III

GIRL SCOUTS AND BROWNIES

The Girl Scouts and Brownies got into the act in mid-March when several leaders toured Kennecott properties with the revegetation team. Four troops of Brownies and Girl Scouts then spent a Saturday morning planting seeds and acorns and bare-root trees with their names on in small planters for later transplanting on various Kennecott sites.

The seeds--bitterbrush, four-winged salt bush, cliffrose--were planted in 3600 individual cells. The acorns--hybrid oaks developed by Dr. Walter P. Cottam--were planted in special moist moss for optimum development before transplanting, and the bare-root trees--black locust, Japanese larch, bristley locust--were labeled with the girls' names for planting in a Girl Scout Grove later in the spring.

The following photographs depict the girls doing the planting, and the reproduction of the July 18 issue of the TROOPER, a Girl Scout publication for Utah and eastern Nevada, gives the general outline of the activity under a picture of Rokich and Jones leading the Girl Scout leaders on a revegetation tour of Black Rock Canyon, where many of Paul's experimental plantings have been made during the nearly-twenty years of species testing.

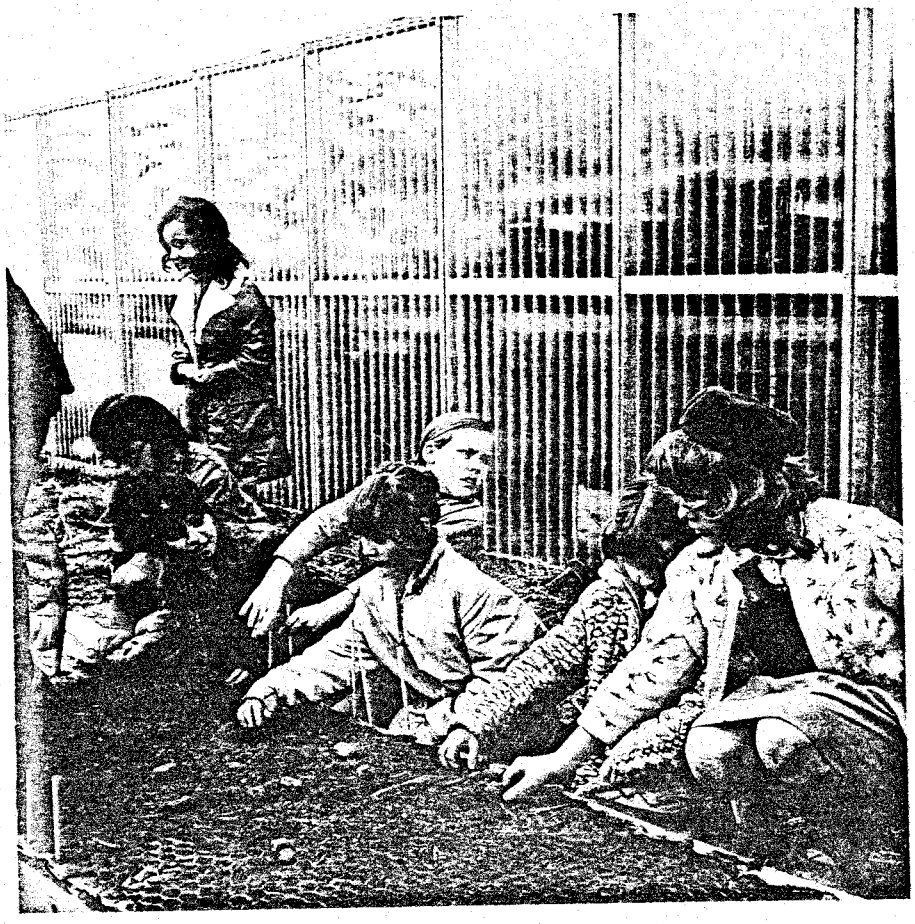
Paul Rokich explains to a Girl Scout leader just how the seeds will help rejuvinate lands denuded by fire, overgrazing and smelter smoke-- before acid plants began cleaning the sulfur from the stack gases.

Paul Rokich points to a plot he planted in Black Rock Canyon ten years ago as Girl Scout Leaders observe.

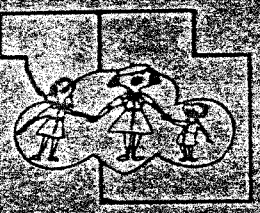
Girl Scouts, Brownies, and their leaders plant acorns of hybrid oaks for ultimate transplanting on Kennecott properties.

Using the old abandoned Greek Theater on the University of Utah campus, a Girl Scout group helps Kennecott's revegetation program

Girl Scouts at Kennecott greenhouse plant bare-root trees in milk cartons for later transplanting on the Oquirrh Mountains.



Girl Scouts plant 3600 seeds of shrubs to be transplanted on Kennecott properties.



the the the TROOPER

FOR GIRL SCOUTS IN UTAH AND EASTERN NEVADA
Served By
The Utah Girl Scout Council

TREFOIL RANCH
BOARD
VISITING DAY

JULY 18

GIRL SCOUTS PARTICIPATE IN KENNECOTT REVEGETATION PROGRAM

L to R. Lillian Harper, Alice Espinoza, Joan Johnson, Larry Jones, Paul Rokich.

More than fifty Girl Scouts and their leaders planted 4300 trees and shrubs in mid-March to assist Kennecott Copper Corporation's Utah Copper Division with a revegetation program under the tutelage of Paul Rokich and Larry Jones of the UCD's environmental section.

Working on a Saturday morning at the division's greenhouse at the University of Utah, the girls planted 3600 seedling shrubs – cliffrose, bitterbush, four-winged saltbush – and 500 hybrid oaks for later transplanting on Kennecott properties as part of a program of revegetation for dust and erosion control and watershed development.

The girls also planted and labeled with their own names some 200 bare-root trees – Japanese larch, bristly locust, black locust – for transplanting in a Girl Scout grove in the North Oquirrhs later this spring.

Mr. Rokich and Mr. Jones feted the Girl Scouts with soft drinks and cake to augment their sack lunches when the planting has been completed. Mr. Rokich also presented each girl with her own Brownie Scout Marigold to be taken home and cared for.

Mr. Rokich has been conducting experimental planting on Kennecott properties for more than 15 years. Mr. Jones, a graduate of both Purdue and Michigan Tech with degrees in forestry, joined Kennecott's Utah Copper Division about the same time that Paul Rokich joined the environmental section staff to implement the revegetation program.

Troops 60, 164, and 389 of the Bonne-Ute Neighborhood and troop 289 of the Antelope Neighborhood participated as did several leaders including Alice Dewell, Alice Espinoza, Joan Johnson, and Lillian Harper, Bonne-Ute Neighborhood Chairman.

Exhibit IV

AERIAL SEEDING

The first major planting project of 1974, the aerial seeding of a thousand acres along the upper end and west side of Smelter Canyon, was accomplished in mid-April. A hired helicopter broadcast seven tons of a special grass mixture developed by Rokich during his 15 years of species testing: 25% Manchar Brome Grass

25% Pubescent Wheat Grass

25% Kentucky Blue Grass

12½% Orchard Grass

12½% Ladak Alfalfa

Bob Woody, business editor of the Salt Lake Tribune, became interested in the unique planting, and in a Sunday article accompanied by a photograph, he outlined the program, highlighting the aerial seeding.

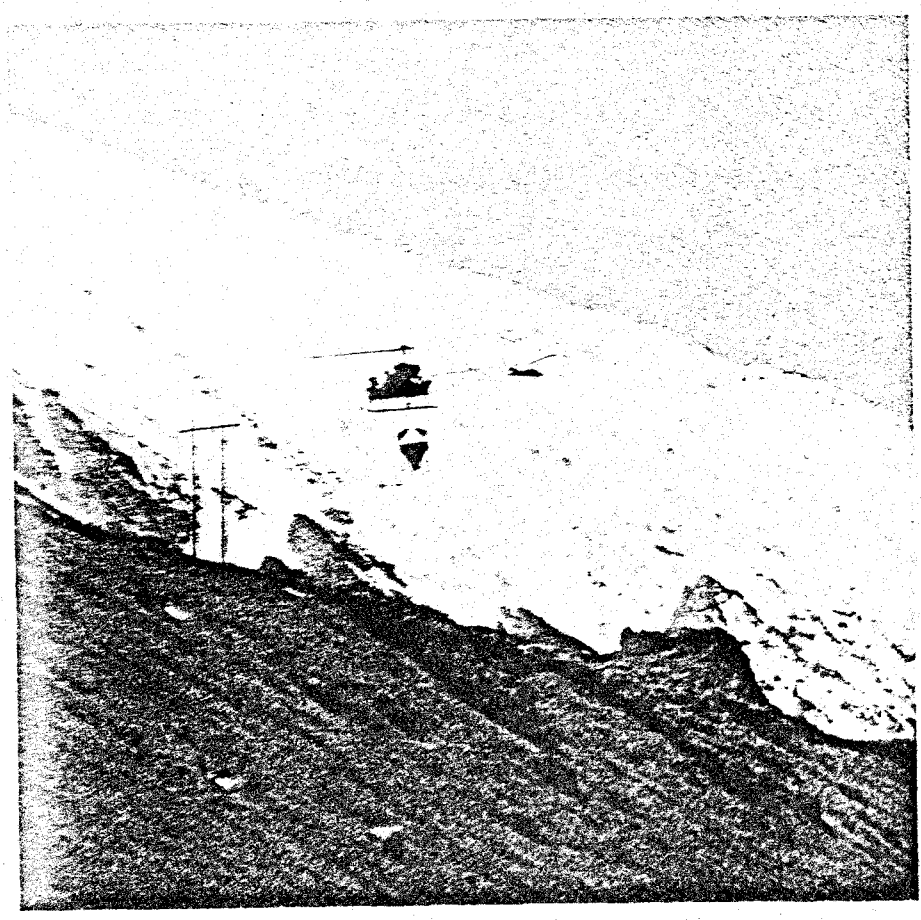
Other photographs on the following pages depict various stages of the project from planning to seeding.

The June 20 issue of the Magna Times nearly two months later covered the aerial seeding in a brief page-3 story.

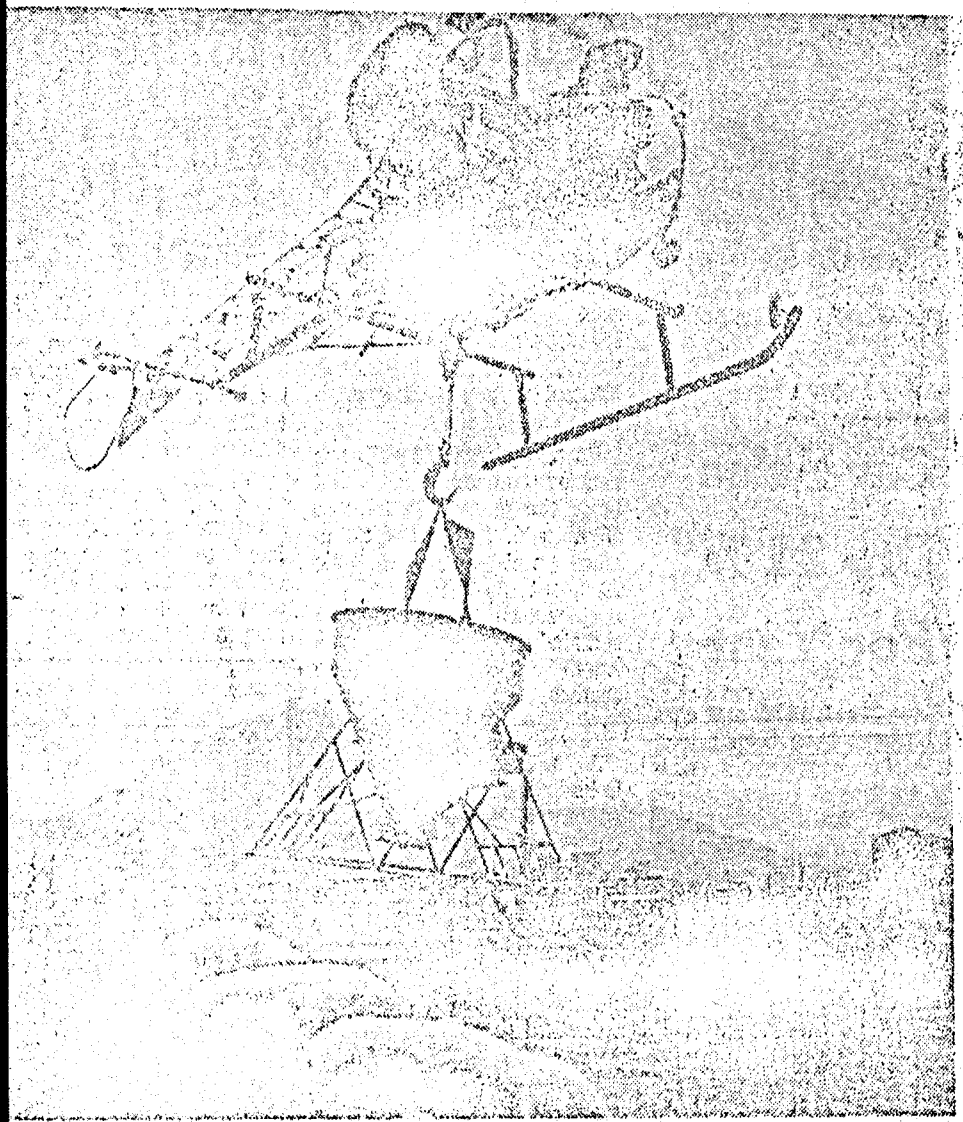
Paul Rokich instructs Larry Jones on aerial seeding project in Smelter Canyon.

Paul Rokich, Larry Jones, and Bob McKee map out seeding areas for aerial broadcasting in Smelter Canyon.

Helicopter hovers over sacks of seed as revegetation team scurries about to fill the seed bin.



Helicopter and seed bin outlined against snowfield in Smelter Canyon during aerial seeding project.



A helicopter lifts off with hopper of grass seed to revegetate northern Oquirrh Mountains. Seven tons of seed were planted by air.

KCC Experts Aim to Restore North Oquirrhs' Vegetation

In 1877, naturalist John Muir had tramped the Oquirrh Mountains and found them forested and beauteous.

His description could not have applied nearly a century later to the northern Oquirrhs — timbered out, grazed out and swathed in the sulfurous emissions of Kennecott Copper Corp.'s Utah Copper Division smelter.

Since World War II, however, the plant has been able to wring out an increasing proportion of the the sulfur from the material it processes. And more will be claimed in a $175-million smelter renovation and tall stack construction program that has just started.

Restoration Under Way

In the meantime, Mother Nature and Man have been restoring the Oquirrhs.

This week, the Utah Copper Division of Kennecott planted seven tons of grass seed by helicopter as part of a revegetation program covering 1,000 acres.

The division's environmental section, headed by Dr. R. J. Heaney, broadcast a special mixture developed by environmental technician Paul Rokich.

Mr. Rokich has been conducting experimental plantings in the Oquirrhs for 15 years. His mix was a quarter Manchar Brome grass, a quarter Pubescent Wheat grass, a quarter Kentucky Blue grass. The rest was balanced mix of orchard grass and Ladak alfalfa.

Already Proved

Nothing was planted that hadn't already proven itself in the area, according to field inspector Larry Jones, a forestry graduate of Purdue University and Michigan Technological University.

According to B. B. Smith, division general manager, Mr. Jones and Mr. Rokich are implementing a broad program involving flood and dust control, watershed protection and landscaping.

Scouts and other groups are part of the program. In March, more than 50 Girl Scouts and their leaders planted 4,300 trees and shrubs on KCC property.

The program also calls for planting 300 acres of Japanese millet on the 5,100-acre tailing pond to control dust, planting grasses and alfalfa on dikes and dumps and borrow areas, planting trees and shrubs to control erosion and improve habitat, and contouring and mechanical seeding to stabilize certain areas.

Later this spring, tentatively on June 1, Mr. Rokich and Mr. Jones will lead environmental groups on a hike that will retrace the route taken by John Muir when he visited the Oquirrhs in 1877.

OMM/KEK/22Apr74 cc: BBS; CAZ, KHM, RJH, DAK

Exhibit V

Utah Nature Study Society Tour

On April 20, 1974 thirty-eight members of the Utah Nature Study Society, under the leadership of Dr. Stanley B. Mulaik (former botany professor at the University of Utah), toured the revegetation projects at the Bonneville Crusher, on the tailing pond dike, in Little Valley, and visited Butterfield Canyon south of the Bingham Mine.

The group also watched a slide presentation developed by Larry Jones and shown at the Cypress High School in Magna and heard a discussion of the total program by Rokich and Jones, who answered questions and outlined future plans including a John Muir Hike later in the spring*, a 15-mile tour of the north Oquirrhs following the route used by John Muir on his 1877 visit to the range.

*due to a series of extenuating circumstances, the John Muir Hike did not materialize either in 1974 or 1975, but plans are currently under way for a John Muir Hike beginning in 1977, the Centennial of Muir's visit to the north Oquirrhs.

April 20, 1974. 8:30 - 3:30

ALL DAY TOUR of Kennecott's Utah Copper Division. An opportunity to learn more about Kennecott's operations along the north end of the Oquirrh Mtns. presents itself in the form of an invitation to participate in a tour on this date. The group will meet at 8:30 a.m. on April 20 at the MAGNA COMMUNITY PARK. This park is at approximately 8600 West on the south side of 21st South. After parking the cars, the group will board busses for a tour of the Little Valley Flood Control, Bonneville Concentrator Dust Control and Landscape Project, and Tailings Pond Dust Control.

LUNCH will be provided at the Magna Community Park. Anyone wishing to leave at noon may do so. In the afternoon, the group will proceed to Butterfield Canyon to look at potential nature study areas, and at recreational and re-vegetation programs. Return to the Magna Community Park will be by 3:30 p.m.

IMPORTANT:-Reservations are a MUST before April 16 in order to know the number of busses needed and the lunches to have on hand. Since the tour will be in the PLANT AREA, persons under age 16 are not permitted on the tour. Sorry, but that is the law. Write promptly to Utah Nature Study Society, 1144 E. 3rd South, Salt Lake City, Utah 84102 or call 359-6560. Mr. Paul M. Rokich, Utah Copper Division, Environmental Section, will be in charge..

Members of the Utah Nature Study Society brave cold weather in April to see parts of revegetation program at Bonneville.

Dr. Stanley B. Mulaik and Kennecott's Larry Jones discuss a point during UNSS tour of revegetation program.

Paul Rokich explains to Dr. Mulaik and members of the UNSS how he has gotten plants to grow on this harsh site.

Utah Nature Study Society. NATURE NEWS/NOTES. June 1974.

MEMORIES AND NOW

Memories came crowding into my mind as we (UNSS members on April 20,1974) stood on the Oquirrh Mts. near the Kennecott Copper Corporation's new crusher plant. Looking down over the tailings pond, I remembered when we (our family) moved back to Hunter, Utah from Rexsburg, Idaho about 1908. Two small towns nestled on the floor of the valley where is now the tailings pond, against a nearby hill which was about 150 feet high. These towns were known to us as "Rag Town" and "Snake Town." The main dusty, dirt road wound around among the shacks and sheds from the east side of this small valley to the west side and on to Tooele Valley. A cut-off road (trail) meandered across the swamps and flat to the Salt Air Pavalion. The towns were real mining towns composed largely of men and saloons but very few women. Gradually over the years, the tailings encroached upon the towns, covering them, the hill, telephone poles and roads until it is over 150 to 175 feet deep today.

The Magna Plant was built first, then the Garfield Plant. The smoke with its impurities soon started polluting the air, killing the vegetation on the northern end of the Oquirrh Mts. and causing much damage to thecrops in the valley, especially in Pleasant Green. After much complaining by the farmers, an adjustment committee was organized and the company paid for the damaged crops. However, nothing was done about the destruction of the vegetation on the mountains. A token of appeasement to a civil group in this area was in the form of supplying materials and paying for a caretaker for a green house on the Feulner property which is to the East of the dike. Here trees and shrubs were grown and distributed to members of the Magna Garden Club. This was in the 1940's, 1950's and 1960's.

As I turned and looked farther south and east out over the valley, I remembered the sprawling community of Pleasant Green, covering the area from 7200 West to the Oquirrh Mts. Soon after the work at the mills successfully progressed, there was a work boom to that part of this county, almost like a gold rush. There was a rapid growth in development and pupulation. A concentrated town began to take form at the foot of the Oquirrhs. This part soon became separated from Pleasant Green and was known by the name of Magna.

Farther south of the new crushers and little valley around the foothills is Coon's Canyon. It was named by the number of relatives by the name of "Coon" who lived and farmed there. Their settlement was known as "Coonville."

All the desecration of the vegetation of the Oquirrhs cannot be accredited to the Copper plant's smoke. Cattle, horses and sheep roamed freely, without restrictions of their numbers, over these hils, valleys and canyons for many years. Farmers also added to the denuding of the hills by unthoughtful cutting of trees for homes, sheds, firewood and fence posts. Much top soil was hauled away thus helping to cause serious flooding.

The land along the Oquirrh Mts. is now almost completely owned by the Kennecott Copper Corporation as far south and beyond Butterfield Canyon. The Corporation, under pressure, is slowly doing something about elimination of the harmful smoke problems. They are also enforcing very strict limitation on grazing. Also they have closed the Canyons to all unauthorized personnel.

Many are the memories of the fun activities, excursions and re-unions that were held up Coon's Canyon. The hikes up to the Indian pictographs are not to be forgotten. The hike to Soldier's flat where some of the U.S. Army men and horses were stationed in the troubled days of early Utah history was interesting for we were always looking for Indian arrowheads.

After seeing the rewards of Paul Rokich's years of dedicated efforts to have vegetation restored to the Oquirrh Mts.,UNSS members boarded the bus again to go to Magna Park and to enjoy a most delicious, catered chicken luncheon. Here again came back memories. My Father was chairman of the committee who started the Park, and my sister had the honor of helping to plant the first tree.

Our family had taken many rides up lovely Butterfield Canyon, but this Utah Nature Study Society's trip was the first time we had been up there so early in the spring. It was a most beautiful and delightful day of memories.

--Reta E. Day, Hunter, Utah.

UTAH NATURE STUDY SOCIETY REPORT ON UTAH COPPER DIVISION TOUR

(Received July 18, 1974)

Volume 20, NO. 10 Mid-Summer 1974

A BELATED REPORT OF KENNECOTT TOUR.

Thirty-nine UNSS members were treated on April 20,1074 to a tour of the Kennecott Copper Division's lands where the work of revegetation which Paul Rokich began 15 years ago is showing results. The Division hosted the trip and provided a bus and an excellent lunch.

Aiding Paul Rokich in interpretation and guiding the group around were Larry M. Jones and Verne Huse, the communication officer for Kennecott. Most of the revegetation efforts are with grasses of several varieties being planted below the old Lake Bonneville level. The 900 or so tons of sulfur dioxide which came from the smelter several decades ago destroyed much of the native vegetation. This effluent has now bee reduced to below 500 tons a day, and plans are to reduce it further with their new plant now in construction.

There has been evidence of slow natural re-vegetation with lesser amounts of pollutants. The work which Mr. Rokich is now doing is speeding up the process. He has found grasses and some trees which are tolerant to the present level of pollutants. UNSS earnestly urges Kennecott's management to give more attention and financial help to to the project and to further reduce their pollution.

Mr. Huser pointed out that $175,000,000 has been appropriated through the head office in New York City for the new plant which will reduce still further the pollutants which the smelter throws out. About $12,000,000 of this, according to some newspaper reports, would be for more efficient pollution control.

It was a most interesting day and Utah Nature Study Society thanks Kennecott management for the opportunity provided to see the on the site work and especially appreciates the interpretation of the three leaders who accompanied the group all day.

Exhibit VI

TAILGATE ECOLOGY

Rokich and Jones developed their "Tailgate Ecology" program in response to an increasing demand from teachers to have the revegetation team visit schools. At Valley View Elementary School Rokich and Jones appeared before 72 fourth graders with a pick-up truck loaded with bare-root trees, empty milk cartons and dirt. The children planted the trees in the milk cartons, using the dirt to pack them in for later planting on various Kennecott properties in the north Oquirrhs. Each student labeled his or her tree, and Rokich promised to plant a Valley View Grove for the class later this summer when the trees have set.

Teacher Lynette Acheson had her students write thank-you notes to Rokich and Jones, bound them into a booklet, and sent them to the team with her own thank-you note. Miss Acheson's note and a few sample student notes appear on the following pages. This program was coordinated by the Communications Department. The demand for the revegetation team continues to grow with no less than three requests for visits to summer school classes.

(The "Alice" mentioned in the thank-you notes is Alice Dewell, a Girl Scout leader and member of the Wasatch Mountain Club who actively supports Rokich and Jones in their program).

May 5, 1974

Dear Mr. Rokick -

You are great! Thank you so very much for coming to our school + letting the 72 children plant the trees. They were so excited + pleased and greatly impressed by you. Please tell Larry + Alice we also appreciated them + their help.

This summer I shall like to come out + see Black Jack (?) + our trees. Thanks again!

Sincerely, Lynette Acheson

Valley View
1395 So. 100 E.
Bountiful, Utah
84010
Date, April 26

Dear Mr. Paul Rokich

Thank you for coming to our school. About how much does all of the seed cost? I hope our trees will grow. I will have to tell my mom that the smoke is only mist. Thank you again.

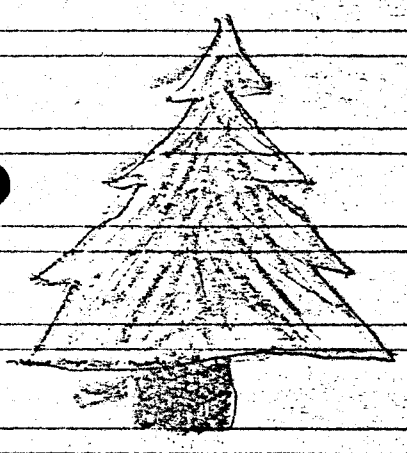
Your friend
Jeff Patton

Valley View School
2143 So. 9 East
April 26, 1974
Bountiful, Utah 84010

Dear Mr. Jones,

Thank you for coming with Mrs. and Mr. Rokich. I didn't think you would bring the plants, dirt, tags and milk cartons right to the school. The reason I planted 3 is because they just kept handing me plants and milk cartons.

Your
Friend
Timothy

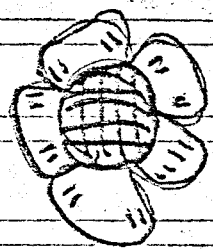


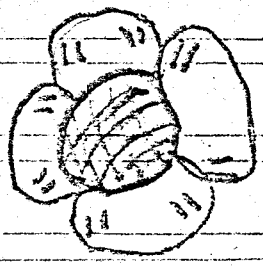
2811 S. 9th E.
Bountiful, Utah
84010

April 26, 1994

Dear, Mr. Paul Rokich

Thankyou for coming to our school to talk to us. Thankyou for letting us go outside and let us plant our trees it was very fun. I think your job is very interesting.





Love
Sarah

Valley View School
2113 Lane 2 East
April 26, 1974
Bountiful, Utah 84010

Dear Mr. Rokich,

Thank you for coming and talking to us about the Oquirrh mountains and Kennecott Copper mines. I hope the trees and bushes grow and especially mine because when I grow up I want to take my children there and show them my tree.

Your friend
Timothy

528 E. 1600 S.

Bountiful, Utah

Apr. 25, 1974

Dear Mr. Paul Rokich,

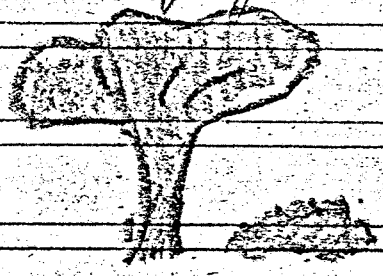
Thank you for coming I wish you would come every day. Not just to plant trees and tell us about Kennecott but to take up some of the school day! But really I love to plant trees its awful fun. I wish my job was just to sudy about trees and Kennecott. Maybe in the next hundred years people won't no what pollution is. I hope so!

Your friend
Karen Moss

211 Claremont Dr.
Bountiful, Utah
April 26, 1974

Dear Mr. Rokich,

Thank you so much for coming and helping us plant the trees for Kennecott. It was really fun! I enjoyed it. I hope they grow!



Love
Susie
Becker

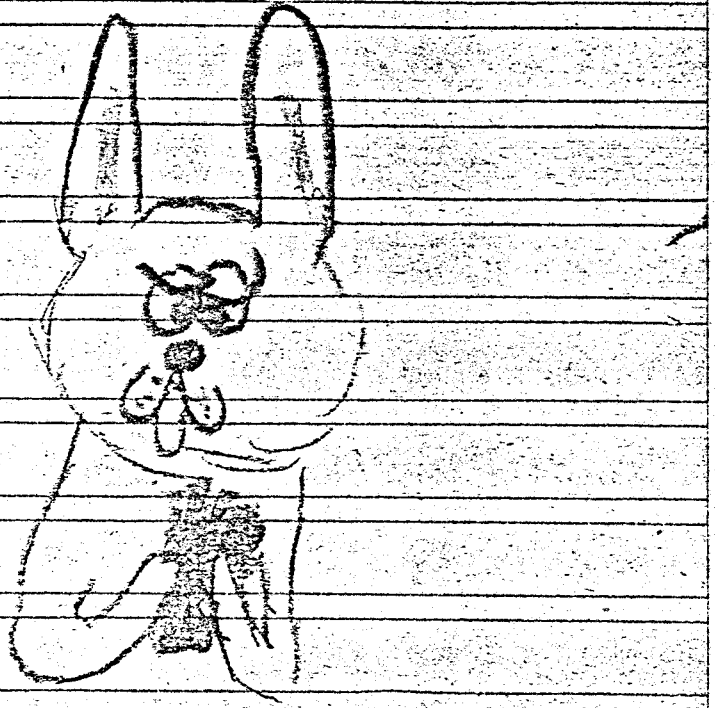


Exhibit VII

"Someday I'm Going To Replant That Mountain"

Robbie Snow, IN editor for the Salt Lake TRIBUNE, became interested in Utah Copper Division's revegetation program through the involvement of Brighton High School HIP students (see Exhibit II). The IN section of the TRIBUNE, a regular Friday feature, usually deals with young people and their activities.

Ms. Snow toured the various projects, spending several hours with Rokich and Jones. The following feature appeared in the TRIBUNE on Friday morning, May 17, 1974.

'Some Day, I'm Going to Replant That Mountain!'

By Bobbie B. Snow
IN Editor

Thirty-five years ago, a young Paul Rokich stood with his father in Smelter Camp, Utah, at the base of Black Rock Canyon.

"Some day, I'm going to replant that mountain," the boy told his father.

Last year with the help of students from Brighton High School, Valley View Elementary school and Boy Scouts and Girl Scouts, his childhood dream came true.

"You can have your Wasatch Range. For me this canyon holds some sort of magic. I would rather spend my days here than anyplace else."

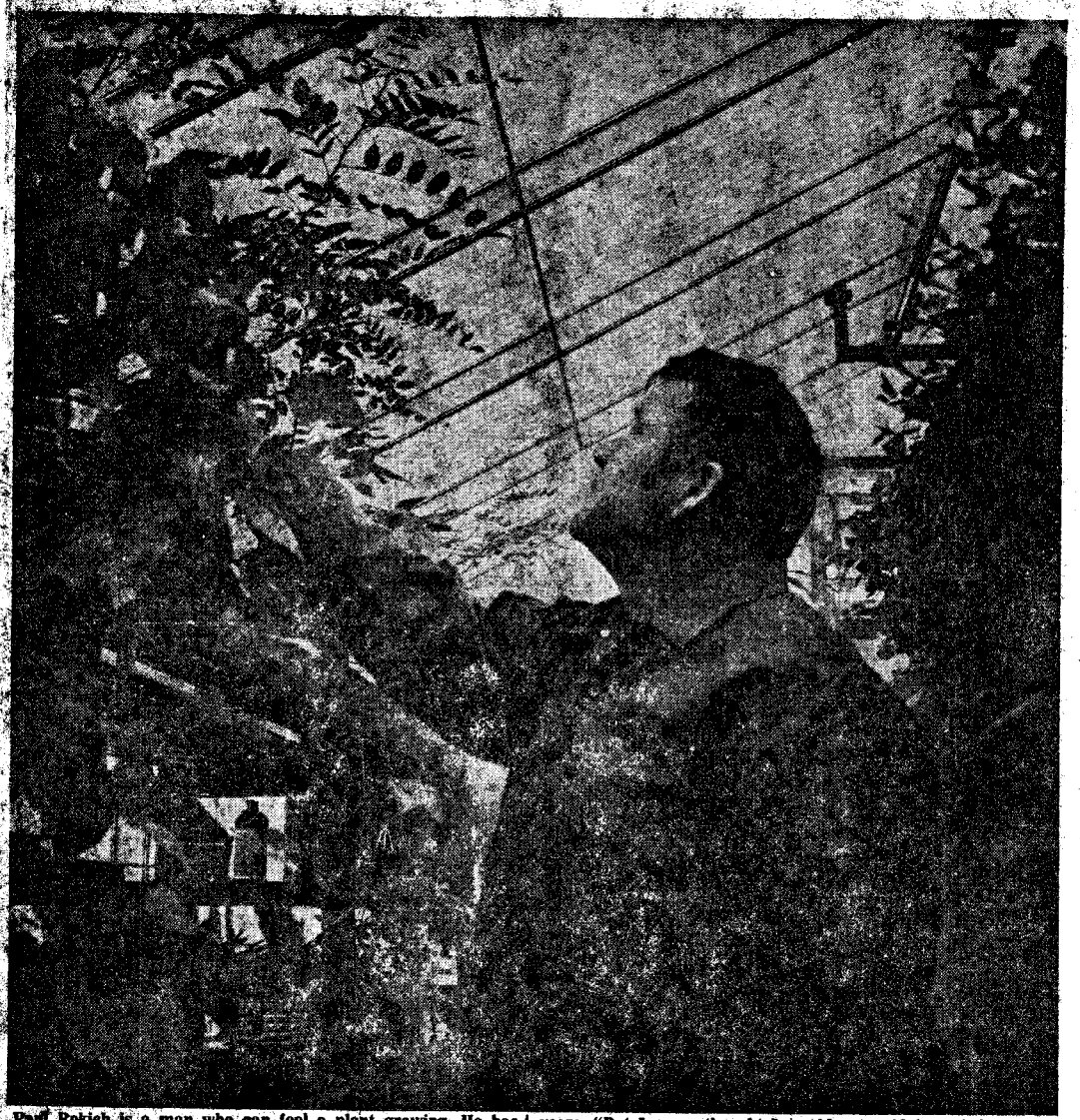
And he is. His love for the canyon is infectious.

"Some of the students keep coming back and helping to do the replanting"' he smiled. "I don't know, maybe they feel the magic of Black Rock that I do.

"I'm replanting the area for the kids. To give them some place to study the true botany of the area. The white top, tall wheat and yellow clover you see around now are the disturbed botany.

"I want the young people to be able to enjoy this canyon. I want the wildlife to come back. I want Black Rock to be a beautiful canyon again."

The Salt Lake Tribune
IN
Friday Morning, May 17, 1974
Section E Page One



Paul Rokich is a man who can feel a plant growing. He has been replanting lands around Kennecott Colper Mine for 15 years. "But I never thought I would get paid for it," he says. He used to pack the seeds in on his back, now he drives.

Larry Jones is an easterner who believes that you can make rock grew green. He likes plants.

Hired By Kennecott

For the 15 years before he was hired by Kennecott Copper Corp. as an environmental technician, Paul Rokich had been working on his dream.

"I used to sneak in at all hours of the day and night and plant grasses, trees and shrubs in Black Rock Canyon. I would park my car pretty far down the hill so that no one would see me. Then I would put the trees and seed on my back and hike in.

"But I never thought that I would get paid for doing it. Kenecott has been a great help in making this all come about."

Instead of doing all his planting alone these days, Paul has enlisted the help of the people for whom he is doing the planting. Paul's assistant is Larry Jones, an easterner who believes that you can make rock grow.

"You know it's funny," said Larry, "but I gained all my knowledge from going to school and Paul has his from the years of working in the area. Now we're putting them both together and the mountain is beginning to sprout."

Disbelief's Upsetting

One thing which is upsetting to Paul and Larry is the disbelief people show when they hear about the project.

"The excuses people make really get to me sometimes," explained Paul. "If it's growing they say, 'Well, the smoke doesn't blow this way anymore,' or 'The plants are mutants.' The smoke is still there, but the emmissions have been reduced. And as for the plants, it takes 500 years for a mutant to become dominant."

Paul and Larry are not public relations men for Kennecott. They resent the title.

Jeff Metcalf, center, special project instructor for Brighton High School, helps with planting his students were involved in. Students keep wanting to come back.

"We went to Brighton High School to talk with the students. They really questioned me about the project. I wouldn't have lied to them. Now these kids come out to the site and help. They have seen what we have done and are excited about the area."

"This type of project is a way of getting people involved with helping the environment, themselves and Kennecott," said Vern Heuser, communication specialist for environmental matters.

"One thing about Paul and Larry," said Mr. Heuser, "is that they know what will grow out there and survive."

Plants Are Beneficial

"I refuse to plant junk just for show," said Paul. "What I plant will be there for a lifetime, and will be both green and beneficial to the wildlife and the ground as well.

"But I won't plant something that will be green immediately. Because it looks like junk in a few weeks. What I plant will take time, but it will be quality foliage.

"You don't have to spend a lot of money to get quality. We planted the dump on the left side of the road coming into the plant for about $12 an acre."

They have run into some bureaucratic red tape on occasion.

"Sometimes I feel that they hired us just for show — token environmentalists — but basically I can't complain. It's just that they have to learn that plants can't wait two

Continued on Page E-2
Column One

More Brighton High students learn how to make a mountain green. The teens are part of Paul Rokich's plan in replanting the lands around Kennecott Copper Mine in Magna.

They're Replanting The Mountain

Continued From Page E-1

weeks on decision making," both agreed.

Paul and Larry have a wide range in which to work their green thumbs. They have planted seven miles around the tailings pond to control dust. The grasses are growing. The project has scattered seeds over 1,000 acres of the canyon behind the Kennecott smoke stacks by helicopter, planted grasses, trees, shrubs and even some iris. They are working on flood control.

By some botanists' standards, Paul and Larry's methods would be considered unorthodox.

"We know the rules. If anyone had told me that I would be planting grass in July, last year, I would have called them crazy. But that's what we did and the grass is growing. People say that we aren't following the rules, but the stuff we have planted proves that it grows. Last year, we planted two acres of the tailing pond with Japanese millet and they want 300 acres done this year. We are proving that plants can be grown out there," said Larry.

"As far as the rules are concerned, if we're not sure that it will grow, we don't plant it. But if we have a hunch that the plant just might make it, we try. If it grows we look good, if it doesn't, then we find out why. We learn both ways."

Every night before he goes to bed, Paul Rokich gets in his truck and views his estate.

"You know," he said, "the greatest thanks I get is seeing these plants grow. I can feel it. I'd do it all over again, if I had the chance."

Exhibit VIII

Inhouse Tour

The following day (May 18, 1974, a Saturday) the revegetation team of Rokich and Jones and environmental field engineer Bob McKee led a tour of the projects at the Concentrator for Concentrating Manager J. C. Larson and Process Control and Environmental Engineer Robert J. Heaney, who heads the division's environmental section and consequently the revegetation program.

Verne Huser, communications representative, accompanied the tour that included the Bonneville and Little Valley projects, the tailing pond dike project, and Coon Canyon, where evidence of overgrazing has begun to cause some concern to the revegetation team.

Larry Jones, Paul Rokich, Dr. Robert J. Heaney, and Jack Larsen tour area at Bonneville where drilled grasses have done well.

Bob McKee points out grasses on a harsh site near the Bonneville Crusher where Rokich and Jones have planted a special grass mixture.

Exhibit IX

Aerial Spraying For Control of Dust

While not an actual part of the revegetation program, the use of a DC-6 for spraying an encrusting agent on the tailing pond surface to help control dust is closely related and illustrates Utah Copper Division's continual environmental efforts.

On May 21, 1974, a communications representative accompanied KSL's Herb Murray and Ed Yeates to the tailing pond where Ted Hardy provided the background for the program involving the use of the large airplane for low-level aerial spraying.

That afternoon and evening on KSL-TV's regular news program, a four-minute feature appeared dealing with Kennecott's aerial spraying program to control tailing-pond dust.

As a follow-up of this positive coverage, McDonnell Douglas, the company that built the airplane, featured Kennecott's use of the DC-6 in company publications.

Exhibit X

FORMULA FOR GROWTH: INVOLVE PEOPLE

The May-June issue of Kennescope includes a 4-page article on the revegetation of the Oquirrh Mountains that details in photographs and words the various projects and enumerates most of the people involved.

Kennescope

Published by
Kennecott Copper Corporation
Utah Copper Division
P. O. Box 11299
Salt Lake City, Utah 84111

No. 152 May-June, 1974

Division outlines details of smelter control plan

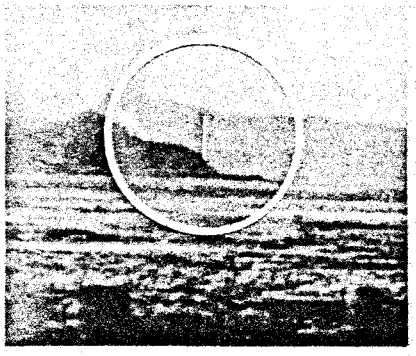
UTAH COPPER DIVISION unveiled details of its $175-million smelter emission control program May 9 at a press briefing in the Rodeway Inn. Elements of the program were discussed by B. B. Smith, general manager; K. H. Matheson, project manager, environmental control program; C. A. Zeldin, smelting and refining manager; Dr. R. J. Heaney, process control and environmental engineer, of Utah Copper Division, and Dr. Frederick E. Templeton, assistant to the president, Metal Mining Division.

Mr. Smith explained that studies at the smelter showed extraordinary measures would be required to meet applicable ambient air quality standards. Contributing to especially challenging problems are a variety of sources of emissions, mountainous terrain and complex meteorological conditions.

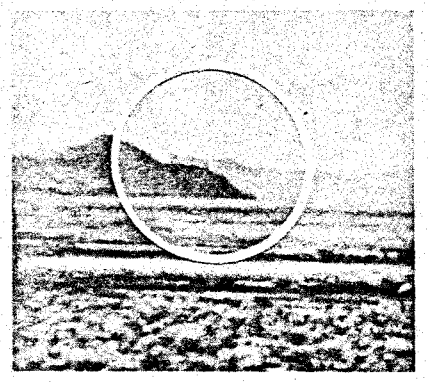
It was pointed out that major elements of the program, determined after comprehensive field and laboratory tests and engineering studies extending over several years, include extensive modification of the process gas handling

Continued on page 6

General Manager B. B. Smith discusses smelter control plan, flanked by C. A. Zeldin, F. E. Templeton, K. A. Matheson and R. J. Heaney, from left.



Engineer conceptions of how the new stack will look from the U. of U. . . .



. . . from vicinity of 17th South . . .

. . . and from about 33rd South at Wasatch Boulevard, just a tip near Smelter Peak will show. Farther to the south, stack won't be visible.

Inside you'll find . . .

	Page
Revegetation of Oquirrhs	2-5
The mine, then and now	8-9
Personnel news	11
EPA Interference	11
Service award banquets	12-13
News of the company, people	14-15
Bond drive kickoff	16
Suit to challenge EPA	16
KCC eyes expansion	16

Volunteer Brownies under supervision of Larry Jones, right foreground, and Paul Rokich, center background, prepare soil for the planting of seedlings.

Formula

"WHAT MAKES IT WORK," says Kennecott forester Larry Jones, speaking of Utah Copper Division's revegetation program, "is the involvement of people: Management personnel, employes from dozer operators to warehouse workers, even volunteers from outside the company."

Jones, who — with environmental technician Paul Rokich — has been moving ahead with a broad-spectrum program at the north end of the Oquirrh Mountains, has been with the division barely a year, already finds progress in the program.

"Last year we planted a mere two acres of Japanese millet on the tailing pond," he relates, "but this year we plan to plant 300 acres in our efforts to control the dust." The spring planting program included aerial seeding in Smelter Canyon by helicoper of seven tons of a special grass mix developed by Rokich through years of experimental planting.

The Jones-Rokich team has conferred with state and federal agencies and the major university botanists and research directors as well as with members of other mining companies' revegetation staffs. The Soil Conservation Service surveyed a catch basin behind the

Brighton High School volunteer students turned out for a day of planting along railway grades and hillsides in the area of the Bonneville concentrator.

Students on the march from trucks to planting sites carry armloads of shrubs and tools.

for growth: Involve people

smelter in early April, and both the State Division of Forestry and the U.S. Forest Service have provided technical advice and planting stock.

Dr. Walter P. Cottam, professor emeritus at the University of Utah, and Dr. Kimball Harper, head of

Our environmental section has launched a broad plan for restoring the Oquirrhs

the botany department at Brigham Young University, have worked closely with the program, and both Utah State University and Montana State University have helped.

Troops of Boy Scouts, Girl Scouts and Brownies as well as school classes interested in ecology have helped with various aspects of the planting programs; the Utah Nature Study Society headed by Dr. Stan Mulaik recently toured the revegetation projects in Little Valley and on the dikes.

On Arbor Day 37 Brighton High School students of Jeff Metcalf were honored by Kennecott for their efforts in the revegetation program. On several occasions during the past year the students have planted trees and shrubs on Kennecott properties. The certificates presented to the students following a cookout in Coon's Canyon read as follows: "The Utah Copper Division, Kennecott Copper Corporation, pays grateful tribute for dedicated involvement in the revegetation of the Oquirrh Mountains, Arbor Day, 1974."

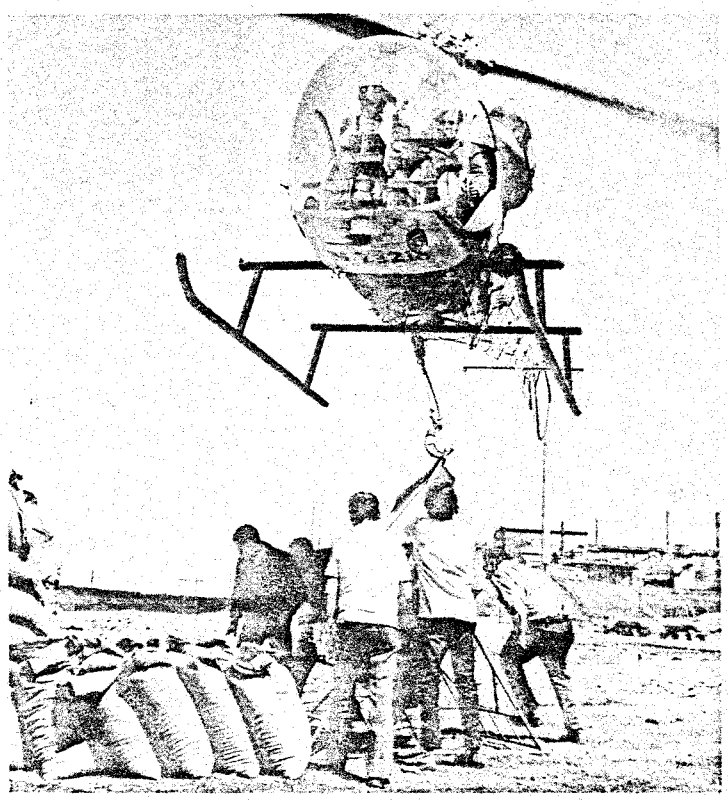
Visiting one fourth-grade class in Bountiful recently, the team of Jones and Rokich developed what they call "tailgate ecology." Hauling a pickup load of dirt and a few dozen bare-root trees to the school, Paul and Larry had the youngsters planting right off the tailgate, setting the trees into milk

Scouts, students, outdoor clubs, company personnel — all are helping with job

cartons for later transplanting on Kennecott properties.

The revegetation team is high in praise of company personnel who have helped with the various projects: Robert Prescott, Robert Jeppson, Sheldon Bliss and dozer operator Dwane Riley on the Bonneville dress-up and dust control project; Larry Tiffany and Ted Hardy on the millet project and

After a busy day in the field, Brighton students enjoyed a wiener roast with all the trimmings in valley above Magna.



Revegetation efforts included aerial seeding of mountains above the smelter. Hopper carried by helicopter spread seed.

Revegetation -- involved people make

Paul Rokich and Larry Jones lead a walking tour in early spring for members of the Utah Nature Study Society in Butterfield Canyon, just south of the mine.

Robert Bogden on the dikes and dumps project.

D. A. Kinneberg and Doug Mabey have provided important leadership and support for the aerial seeding project behind the smelter, and Bobbie McKee and Robert Johnson helped with the seeding as did numerous warehouse workers.

On the Little Valley project J. C. Larson, Bill Benton, Skip Johnson and Royal Anderson have been the mainstays. All have helped the

Oquirrh Range plantings reduce flooding, beautify, provide wildlife habitat

project become a reality, a continuing program of dressing up the properties and improving the watershed, thus reducing flooding and providing better wildlife habitat.

"What are Paul and Larry up to now?" asks a security guard at the Bravo Gate as the team turns into the concentrator area in Paul's red pickup. They may be on their way to seed 20 acres adjacent to the Bonneville crusher or 300 acres farther up Little Valley. They may

Dr. Stanley B. Mulaik of the Utah Nature Study Society and Larry Jones during tour.

About the author . . .

VERNE C. HUSER, author of the accompanying article, recently joined Utah Copper Division as a communications representative. He was formerly director of the Utah Environmental Center and had been a free-lance writer and photographer for eight years.

Verne C. Huser

In his new position Mr. Huser will develop and coordinate communications associated with various environmental programs in Utah Copper Division.

A former National Park Service ranger-naturalist and a professional river guide, Mr. Huser is an active member of the Outdoor Writers Association of America and vice president of the Western River Guides Assn.

Mr. Huser taught high school English, journalism and speech for 12 years and was recently appointed an adjunct instructor at the University of Utah, where he teaches environmental education workshops in the Division of Continuing Education.

A graduate of the University of Texas, he received a master's degree in education from Hardin-Simmons University. He held a Fulbright Fellowship in Greece.

it happen

be going up to water the trees that Brighton students planted along the railroad fill or to direct some dozer work in the gully.

Wending their way through smelter facilities on their way to the third dike to clean the catch basin or plant some grasses on another experimental plot, Paul and Larry study the scene, evaluating the revegetation potential. Their schedule calls for grain-drilling 200 acres behind the smelter in the fall, planting shrubs and trees, and in general dressing up the area.

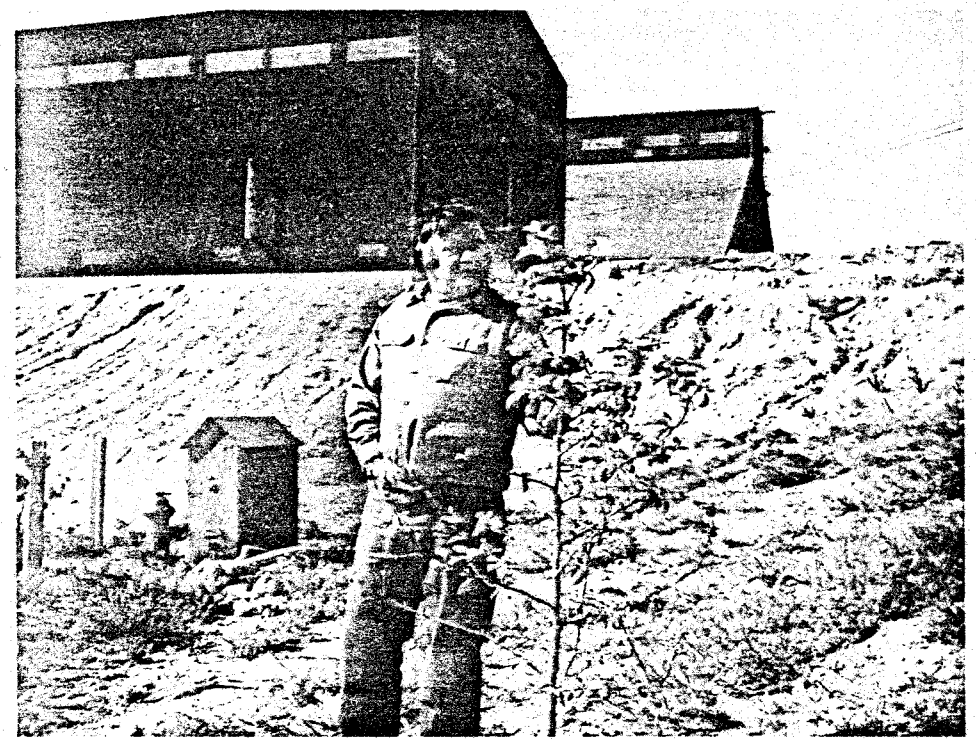
At the mine they plan some experimental plantings on overburden dumps in a project backed by Dean Kerr.

The environmental section is headed by Dr. R. J. Heaney. Alton Huffaker has immediate supervision of the revegetation program.

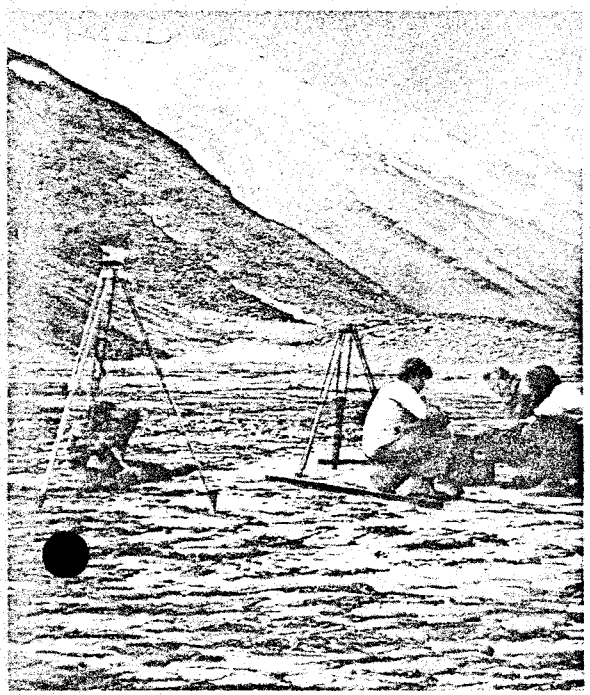
Throughout the properties, the revegetation team continually expands its program, dressing up areas in flood- and dust-control projects, watershed development, habitat enhancement, landscaping and cleanup efforts.

Any spots in your plant area that need the green-thumb treatment?

—Verne Huser



Paul Rokich calls this niche near the Bonneville concentrator his "garden," because of fruit trees and other vegetation he cultivates in the rocky soil.



A Soil Conservation Service survey team advises KCC crew on cleaning a catch basin.

Girl Scouts and Brownie leaders were taken on tour of Black Rock Canyon by Jones and Rokich. Here the group examines self-seeding experimental grass.

Exhibit XI

ENVIRONMENTAL EDUCATION WORKSHOP

An outgrowth of the work done by Brighton High School students in the revegetation program (see Exhibits II and III) is the proposal for an environmental education workshop in which several school districts would develop a cooperative program with Utah Copper Division to initiate " a summer environmental workshop in the Oquirrh Mountains for Salt Lake area youth for the betterment of both." The proposal follows indroductory comments by Larry Jones, who has worked with the program planners.

Dr. Florence Krall (Department of Education, University of Utah) who also worked with the planners of Earth I, visited the division's re-vegetation program in Black Rock Canyon with a class of environmental education students from the Un iversity on May 21, 1974 with Jones and a communications representative.

UTAH COPPER DIVISION

INTEROFFICE LETTER

TO B. G. McKee

DATE May 2, 1974

FROM L. M. Jones

SUBJECT Environmental Education Workshop

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1. During November, 1973 through February, 1974, Jeff Metcalf, of Brighton High School; Aaron Boswell, of East High School; Bruce Plenk, of Murray High School; Dr. Florence Krall, University of Utah, Department of Education and I met on our own time to formulate an environmental workshop involving the Tooele, Granite, Jordan, Murray and Salt Lake school districts and the Utah Copper Division. These planning sessions were supported by Messers. A. W. Huffaker and P. M. Rokich. The final proposal was to be submitted as part of the overall land-use plan this spring.

2. I would like to emphasize that at no time was any commitment made that the program would actually take place or, if it was to take place, how soon. It was agreed that we wanted simply to write a program, submit it to Utah Copper Division and have them give us their opinion on how they felt about such an undertaking. I feel that since the total proposal has become delayed by the urgency of this past month's field projects, the environmental workshop section should now be submitted for preliminary review and feedback from Utah Copper Division.

3. The past cooperation and activities between the schools and Utah Copper Division have been very successful and beneficial as good public relations and meaningful activities for both parties. To allow the review of this section of the proposal to be delayed any longer is unfair to those who have put in their time and effort developing this program.

4. I would appreciate a reply as to your comments on this subject.

L. M. Jones

L. M. Jones

/rgj

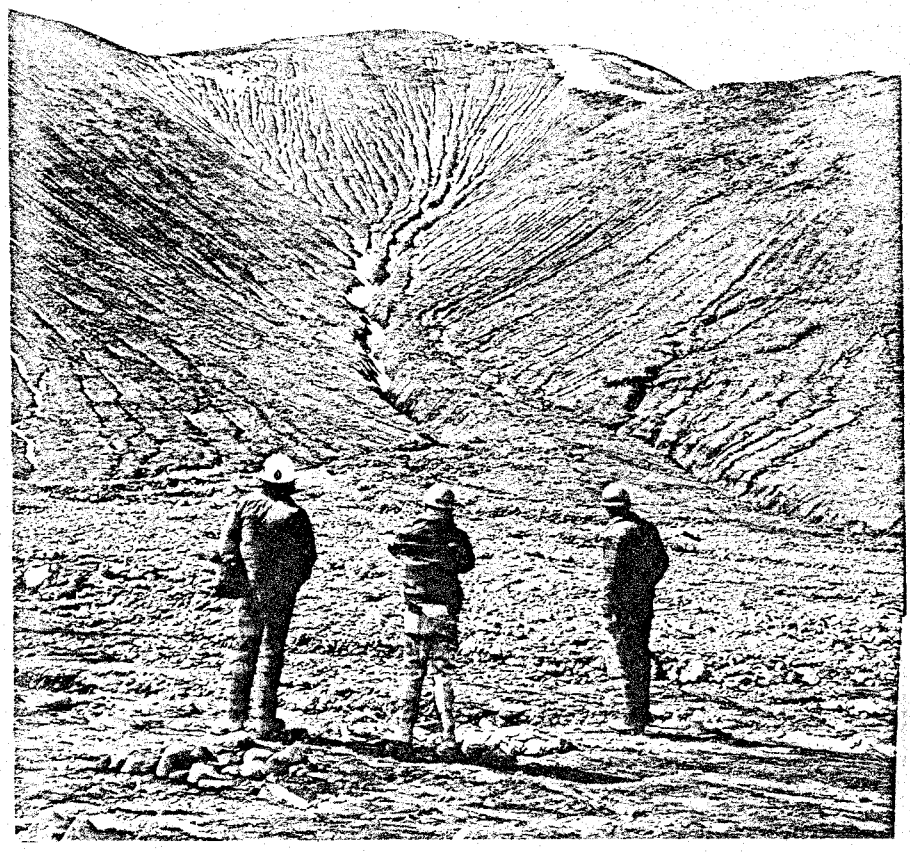
cc: R. J. Heaney
V. C. Huser
A. W. Huffaker
P. M. Rokich

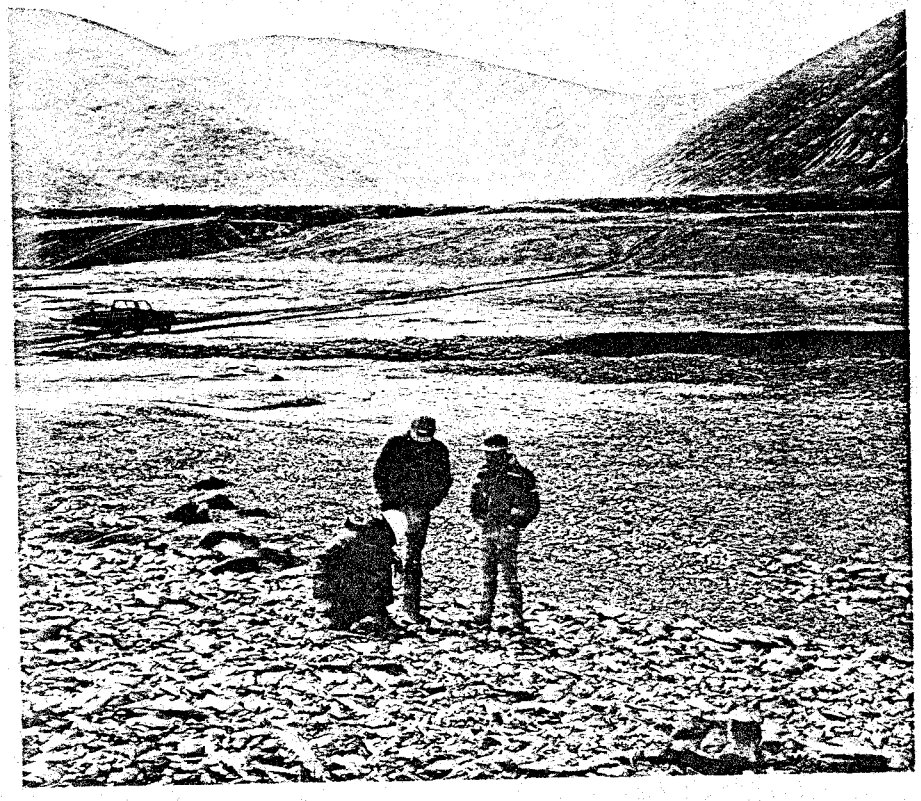
Exhibit XII

SOIL CONSERVATION SERVICE

Representatives of the revegetation program met with Soil Conservation Service representatives and smelter personnel April 8-9 to survey the dikes in Kessler Canyon, primarily the Third Dike, to determine what should be done to prevent flooding on both a short-term and long-term basis (a sudden downpour the fall of 1973 sent a 15-foot wall of water through the drainage tunnel beneath the smelter). The sediment basins behind the dikes are presently full of silt and stone--there is little room for storing any more sediment or water.

The group met again June 10 and again June 26 to determine what course of action should be taken, and a professional engineering firm has been retained to take that action.





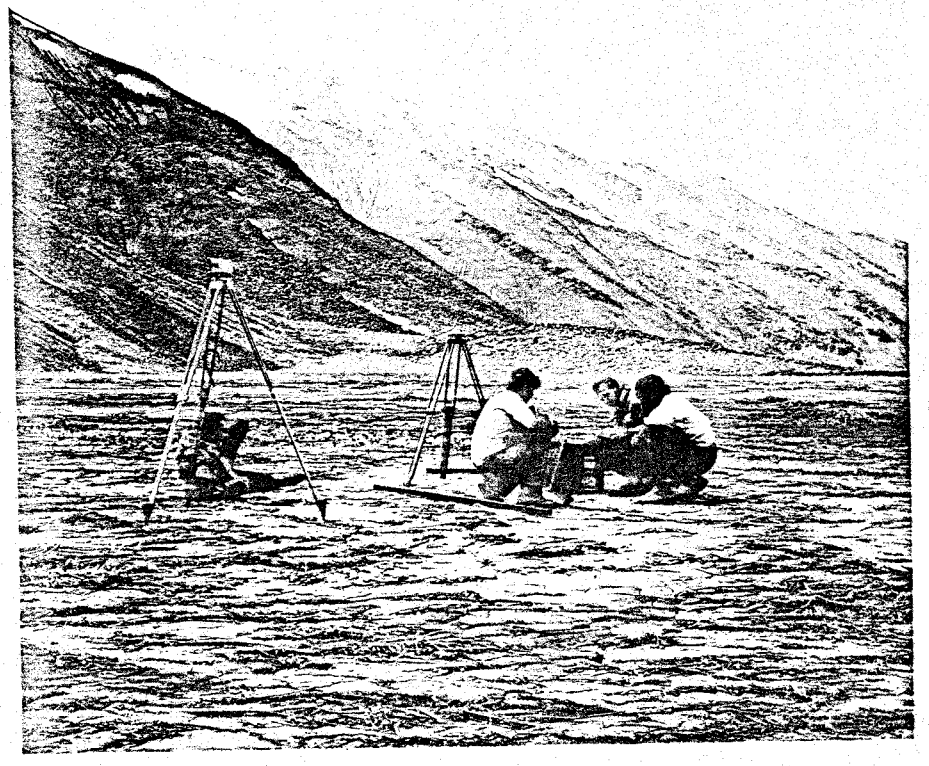


Exhibit XIII

Flood and Dust Control

In response to a query from Theodore Osmundson and Associates of San Francisco for information relating to the Utah Copper Division's efforts "to mitigate the visual impact of industrial facilities on the landscape," the Communications Department developed the following summary of those aspects of the revegetation program relating specifically to flood and dust control.

UTAH COPPER DIVISION (KENNECOTT COPPER CORPORATION)

REVEGETATION PROGRAM

Flood Control -- Smelter and Kessler canyons behind the smelter have been diked and the run-off diverted by structures constructed during CCC days in the 1930's. More recently -- as sulfuric acid plants have removed more and more sulfur dioxide from the smelter emissions -- natural vegetation has come back, but in an effort to help it along, the UCD revegetation team (Paul Rokich and Larry Jones in the environmental section) has implemented the aerial seeding by helicopter of a thousand acres of the upper watershed with a special mixture of grasses that have proven successful in more than a dozen years of experimental planting in the north Oquirrh Range.

In Little Valley and Coon Canyon on the northeastern aspect of the UCD plant properties, historical flooding areas through the town of Magna, the revegetation team has been seeding wheat grasses and dryland alfalfa, planting trees (Russian olive and hybrid oak) and shrubs (cliffrose, bitterbrush, four-winged saltbush) in many critical areas, and cleaning out holding basins that have silted in.

The UCD has been working closely with the U. S. Forest Service, the Soil Conservation Service, the State Division of Forestry, and university research units in planning future revegetation projects as part of the overall program.

Dust Control -- Three different dust-control projects have been initiated by the Utah Copper Division: 1) tailing pond, 2) tailing pond dikes, 3) Bonneville Crusher. The tailing pond problems have been attacked through the use of ground vehicles spraying water (to wet down sun- and wind-dried tailing) and a chemical agent (to stabilize the tailing material) and of aerial craft spraying an encrusting agent on the drier portions of the 5100-acre tailing pond, portions of which become dried out periodically and are subject to local dust storms.

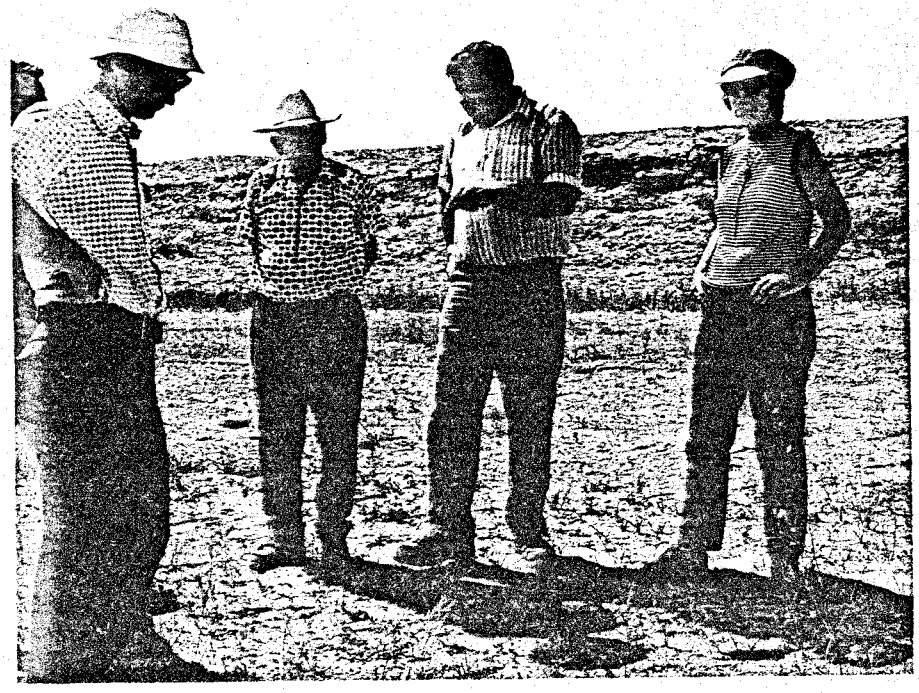
A relatively new project on the tailing pond involves the planting of Japanese millet, an annual grain widely used by ducks and upland game birds. In 1973 the UCD revegetation team planted two (2) acres in an experimental project that proved so successful that in 1974 they plan to plant 300 acres, drilling the grain into the damp tailing and applying fertilizer that will encourage growth (the plant -- under ideal conditions -- sometimes grows to 8 or 9 feet in height). Not only does the millet help to stabilize the surface and serve as a barrier to blowing dust, but it adds organic material to the tailings, thereby tying up the oxygen that might otherwise reduce the pyrites to an acid situation.

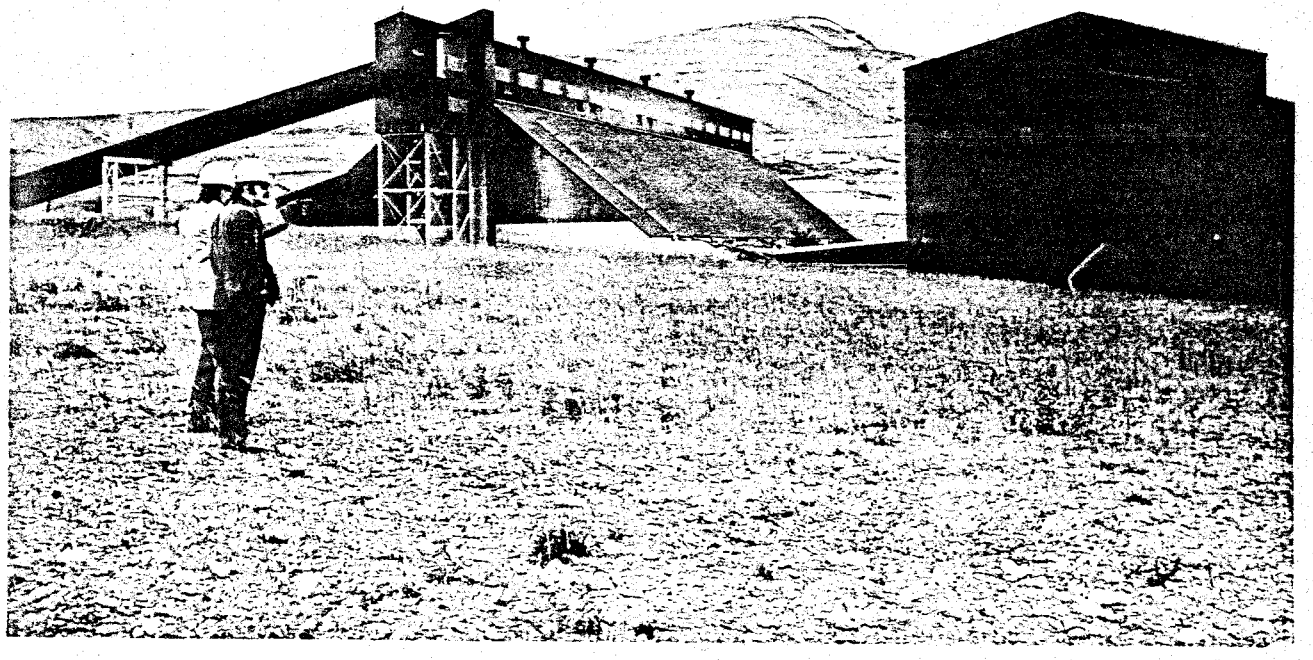
The tailing pond dikes themselves are subject to wind erosion and have been planted with shrubs and trees, primarily Russian olive, and more recently have been seeded with a special grass-alfalfa mixture that seems to offer some promise in reducing wind erosion.

The third major dust-control project involves the Bonneville Crusher above the Magna Concentrator, where construction activities and occasional

spills of slurry from the ball and rod operations had created a dust problem. The whole area around the plants has been contoured and landscaped and planted to grasses that are thriving. They have reduced the dust problem to almost nothing and have also dressed up the area to such an extent that workers at the plants are taking a real pride in the revegetation project.

The revegetation team uses some of the area as a test plot to prove that various plants will grow in what may seem like a hostile environment. Planting various vegetables and fruit trees, shrubs and exotic plants, they have added further to the landscaping.





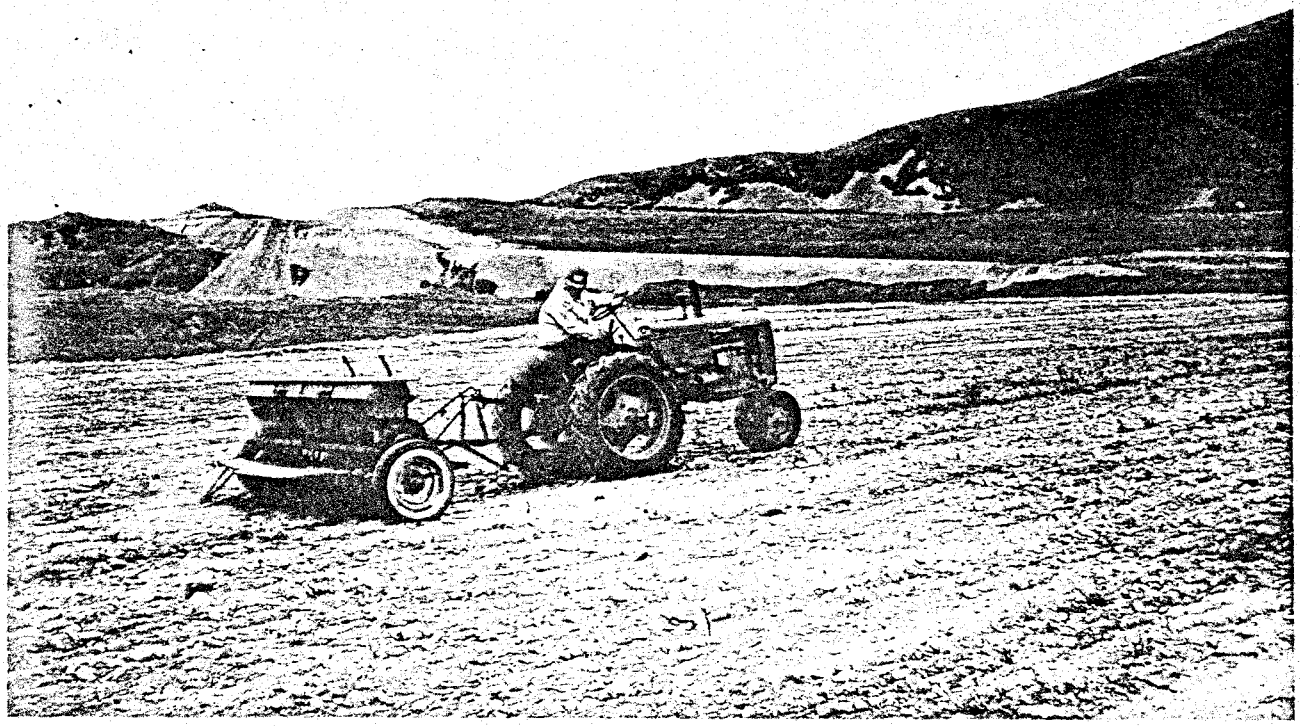


Exhibit XIV

SUMMER AND FALL PLANTING

With the spring planting projects out of the way, the revegetation team is turning its attention to summer and fall planting. More than 20,000 shrubs and trees are currently heeled in awaiting planting on Kennecott properties, and two major planting projects--300 acres in Little Valley and 200 acres in Kessler Canyon--are scheduled for the fall. A list of trees and scrubs includes the following:

Plants for Kennecott Revegetation Program--Kesler and Smelter Canyons:

Common Name	Scientific Name	Number	Size	Total Price
Squawbush	Rhus Trilobata	5,000	6-12"	$1,100.00
Siberian Pea	Caragana arborescens	4,000	9-12"	800.00
Smooth Sumac	Rhus glabra	1,000	9-12"	400.00
Cutleaf Staghorn Sumac	Rhus typhina	1,000	9-12"	400.00
Sanscherry	Prunus besseyi	2,000	6-12"	320.00
Tararian Honeysuckle	Lonicera tartarica	1,000	9-12"	200.00
Douglas fir	Psendotsuga menziesii	500	4-6"	90.00
Hall's Japanese Honeysuckle	Lonicera japonica halliana	2,000	4-6"	220.00
Wild Rose	Rosa rugosa	200	#3's	40.00
American Plum	Prunus americana	1,000	9-12"	100.00
Pyrocantha	Pyracantha coccinea	1,000	4-6"	400.00
Russian Olive	Eleagnus augustifolia	1,000	6-12"	160.00
Aspen	Polulus tremuloides	1,000	3" pot	1,000.00

Exhibit XV

ENVIRONMENTAL CORPORATE RESPONSIBILITY

Salt Lake Area Chamber of Commerce official publication SALT LAKE BUSINESS in its June 1974 issue (Vol. 9, No. 6) published under the tagline Environmental Corporate Responsibility an article about the Utah Copper Division revegetation program. Entitled "Restoring the Good Earth," the two-page piece (pages 10-11) written by Communications Representative Verne Huser outlined the basic elements of the program launched by the Environmental Section under Dr. R. J. Heaney and implemented by the team of Rokich and Jones.

Environmental Corporate Responsibility

Restoring the Good Earth

by Verne Huser

For some time air quality critics have been pointing their distrustful fingers of gloom to the billows of smoke in the Salt Lake Valley's western skies. At the risk of high cost and with recent technology, these billows will soon be barely visible and harmless.

And quietly, without much fanfare, another revolution is taking place in the earth below on the slopes of the Oquirrhs and across the acres of tailing ponds.

Kennecott Copper Corporation's Utah Copper Division has gone into the "revegetation business" in a big way. Now in its second year, results are beginning to show. Spearheaded by Kennecott's Process Control and Environmental Section, the multifaceted planting and educational project is picking up momentum. Two men — Paul Rokich, an environmental technician, and Larry Jones, a field inspector, are directing the project.

In mid-March of this year, some fifty Girl Scouts and Brownies and their leaders planted 3,600 shrubs and 700 trees on a Saturday morning. In April, Jones and Rokich supervised the aerial seeding (by helicopter) of seven tons of special grass mixture — developed by Rokich in more than 15 years of experimental planting in the north Oquirrhs. They intend to plant 300 acres of Japanese millet on the tailings pond in a dust-control effort — quite an expansion from the two-acre experimental plot began in 1973.

Rokich and Jones have developed what they call a "tailgate ecology program" in their frequent visits to schools in the Salt Lake area. Initiated at the Valley View Elementary School in Bountiful, this program consists of the revegetation team arriving at the school with a pickup truck load of dirt, some milk cartons and some bare-root trees. The children plant the trees in the milk cartons from the tailgate of the truck for later transplanting in special groves on Kennecott properties.

Kennecott's Tailgate Ecology Program is designed to let students help plant trees and shrubs at school that will later be replanted on Kennecott properties.

Kennecott revegetation is now beginning to show the results of efforts led by Paul Rokich and Larry Jones. Above, Jack Larsen, Concentrator Supt., is being shown how the project is coming along.

Brighton High School students in what is called the "HIP program" have planted trees and shrubs in Little Valley and Coon Canyon as part of the Kennecott revegetation program. Thirty-seven of the students were honored on Arbor Day with the presentation of certificates of appreciation for their involvement in the program and 17 more received identical certificates for their Arbor Day plantings.

An environmental education workshop has been proposed for inclusion in the revegetation program. Working with Dr. Florence Krall at the University of Utah is Jeff Metcalf, Aaron Boswell and Bruce Plenk — teachers of special programs at Brighton, East and Murray High Schools respectively.

Rokich and Jones are working closely with experts of the Soil Conservation Service, the U.S. Forest Service, the Utah State Division of Forestry and research units at several universities around the state.

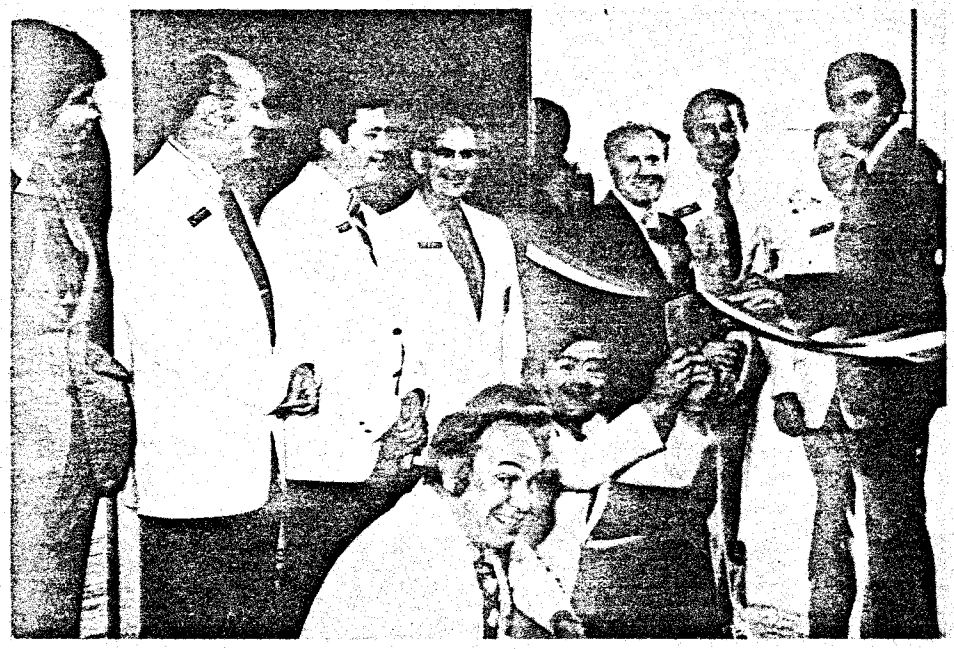
Dr. Kimball Harper at Brigham Young University has worked with Rokich in cataloging the vegetation in the Oquirrh Range and has suggested that present

levels of sulfur removal at the smelter have enabled the natural vegetation to come back.

The north Oquirrhs had been denuded by a combination of earlier logging, wildfire and overgrazing even before the American Smelting and Refining Co. built their facility in 1906. When Kennecott purchased the smelter in 1959, the mountain was showing the accumulated effects of these activities. Rokich can now document the change in the environment by vegetation return and by monitoring of the newly installed sulfuric acid plants. The current $175 million expenditure for air quality control can only further enhance the natural environment.

In May, the Kennecott revegetation team of Rokich and Jones, who operate within Dr. Robert J. Heaney's environmental section, led a tour of the program for the Utah Nature Study Society. Thirty-eight members visited the dust control project at the Bonneville Crusher, the drilled grasses on the tailings pond dike, the Little Valley project, and Butterfield Canyon.

In June the team plans to lead several local conservationists on a major hike in the north Oquirrh Range, following the 1877 route followed by John Muir, one of the founders of the Sierra Club. Members of the Wasatch Mountain Club and the Utah Nature Study Society as well as several Sierra Club members plan to participate. The purpose of the hike? To give environmentalists an opportunity to see what is actually happening int he Oquirrhs in the way of vegetation return—naturally with the help of Rokich and Jones Inc.



Postal Instant Press opened its new office and there to assist in the ribbon cutting were The Salt Shakers. (L to r, standing:) Mike Fletcher, Don Anderson, Wayne Stoker, Don Kennedy, PIP Salt Lake Manager Fred Blackburn, Fred Ball, Lanny Persons, PIP Nat'l Vice President Roger Dunn. (Kneeling:) Jim Schultz, John Dillon and Mike Korologos.

It's Big Sky For the Shakers

Fourteen Salt Shakers made three quick goodwill stops in Montana during May.

The Shakers were greeted at the Missoula airport by a delegation of the Missoula Chamber, the mayor and lovely Miss Missoula. Following lunch at the Edgewater Inn, the Shakers were given a city tour.

In Bozeman, another airport reception was planned. The Shakers were given a VIP tour of the U.S. Forest Service Smokejumpers training facility. An exchange of business and community activities occurred at the evening dinner at the Holiday Inn.

In Billings, the Blue Coats met the White Coats for lunch at the Northern Hotel. Billings is experiencing rather rapid growth and an increase on conventions, reported the Billings Convention Bureau.

The two-day trip by the Shakers was considered a success by Head Shaker Landon Persons.

Exhibit XVI

CAT TRACK ECOLOGY

One of the concepts developed by Paul Rokich and Larry Jones has been named "Cat Track Ecology" by a member of the Communications Department because it involves the use of the tracks made by the steel treads of a caterpillar to help things grow. Each of the tread tracks holds moisture, creates a tiny micro-climate than encourages the growth of species planted for the various projects. This concept has been used extensively around the Bonneville Crusher.

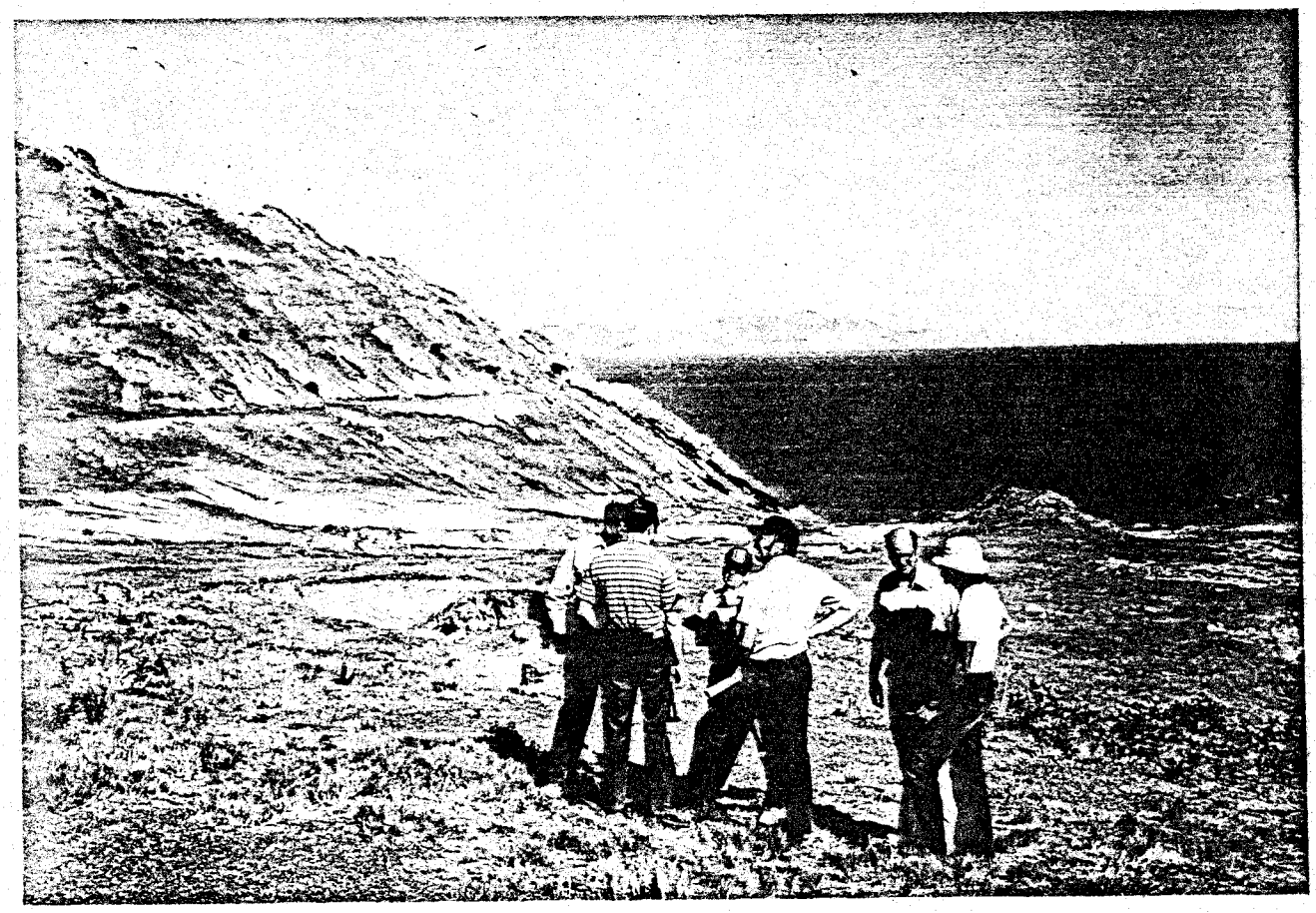
Exhibit XVII

Potential Recreational Development

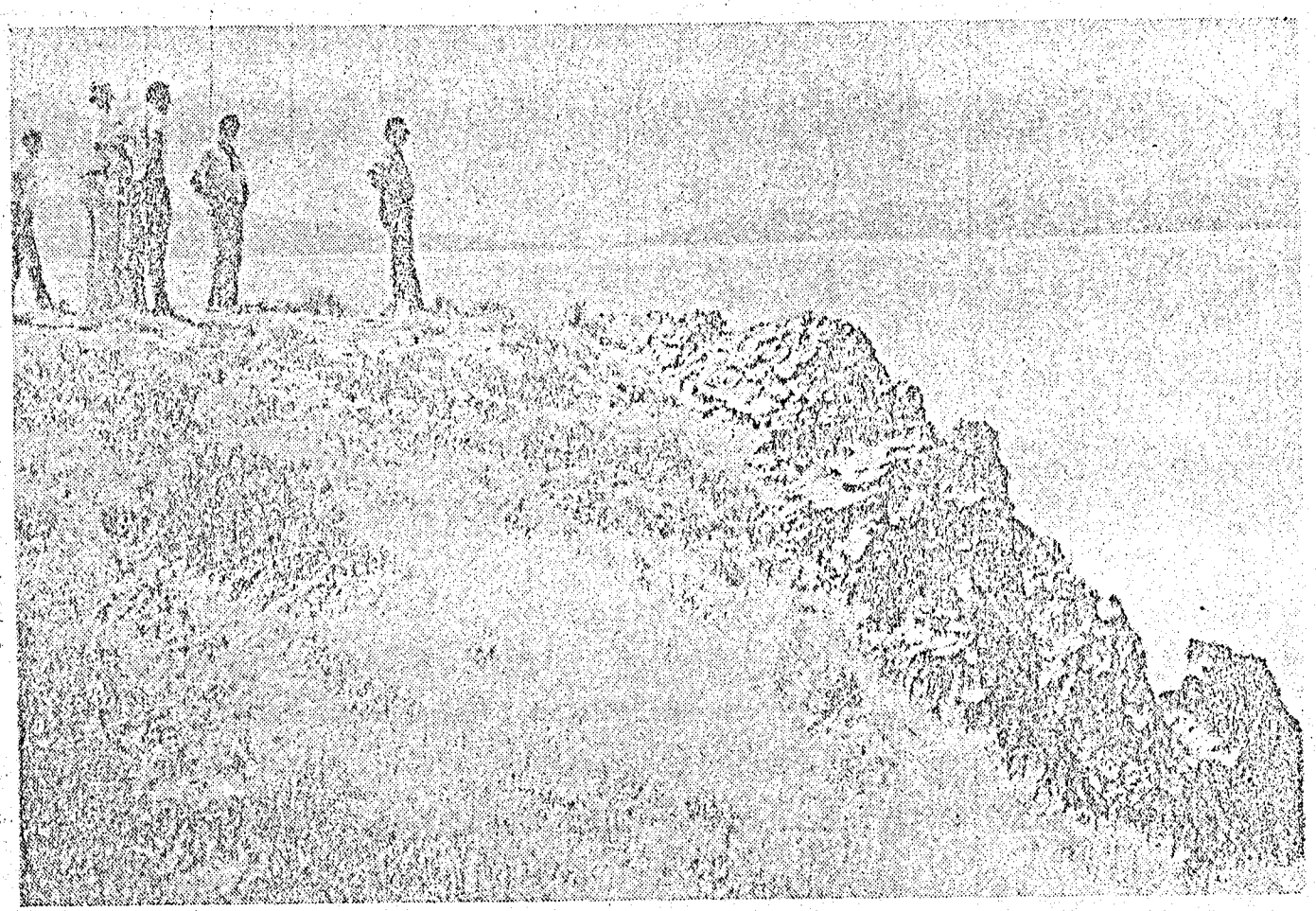
Recreational development along the southern shores of the Great Salt Lake has been a dream of the Utah State Division of Parks and Recreation for decades and is closely tied to Utah Copper Division properties in the north Oquirrh Mountains. On June 20, 1974 representatives of UCD (Engineering, Communication, and Environmental departments) led a tour into Black Rock Canyon for representatives of the Utah State Divisions of Parks and Recreation and Water Resources for the purpose of locating a possible well site for water needed in developing the south shore recreational facilities.

There was talk of developing wildlife watering stations in Black Rock Canyon and of using the area for an overlook of the lake--though several other sites were also mentioned for this purpose. The tour also enabled UDC revegetation team representatives an opportunity to exhibit the return of natural vegetation to the canyon and the progress of the experimental plantings done by Paul Rokich over the previous 18 years.

On July 10, 1974 Dr. R. J. Heaney, Larry Jones, and Verne Huser accompanied the Utah Legislative Council to an ancient Bonneville Lake bench overlooking the Great Salt Lake to hear several plans for development of south shore beaches. Kennecott figures heavily in the plans: providing lands, fill material for beaches, even possibly water for the project. The meeting was covered by both the Tribune and the Deseret News.



A better way to see lake: paved road



Great Salt Lake Policy Advisory Committee members view lake from spectacular overview.

A new attraction for tourists and residents alike could be added to Great Salt Lake if the state would pave a four-mile road to a mountain lookout point two miles west of Black Rock.

Jeep-driving Tooele residents took members of the Great Salt Lake Policy Advisory Committee up to the wind-whipped lookout summit Wednesday afternoon to make that point.

The committee is working on a master plan for the lake; development of the plan is also one of the Deseret News Goals for 1974. The meeting Wednesday was at what must be one of the most breathtaking spots in the state.

The shimmering, glass-blue lake stretched far below, changes of depth making streaks and patterns all the way to the distant horizon, with wind-caused ripples glittering in the sun.

About 45 persons made it up the dusty winding trail, with some jeeps making two trips to pick up passengers whose pickup trucks could not negotiate the steep, soft-dirt trail.

Joseph T. Liddell, representing the Tooele organizers of the tour, said the high wind was unusual.

Harold J. Tippetts, director of the State Division of Parks and Recreation, told the group his agency looks on the south shore of the lake as a potential "high density tourist" area.

The state should negotiate the return of John Silver's private lease on his marina-bathing area, Silver Sands, said Tippetts. Silver could then operate concessions in a larger, public-beach development. The south shore would be developed along with Antelope Island State Park.

Silver said the rising level of the lake has been drastically cutting into his profits, adding that the state should buy him out under Tippett's proposal.

The marina has about a 200-boat docking capacity with a waiting list. "I think it's time to make a deal for the good of all concerned," said Silver.

Jack Reynolds, commodore, Salt Lake County Yacht Club, said if there is a proper development of the facility, there will be 1,000 boaters on the lake in five years. He suggested the county construct a new breakwater, to be bought out of the increased tax revenue from boats that will be registered in the county when the facilities are developed.

Walt Katzenberger, Utah Geological Survey, said a new boater's map of the lake should be ready in about a month.

COMM/12July74/KEK

Exhibit XVIII

Mary Sewall, editor of the Utah Environmental News, the official publication of the Utah State Division of Environmental Health, indicated an interest in the revegetation program. Environmental Communications Representative Verne Huser provided her with the essence of the program in an article she used as the basis for a front-page account in the June issue of the publication.

(photo shows Dr. Walter P. Cottam and Paul Rokich examining revegetation efforts in Black Rock Canyon)

UTAH ENVIRONMENTAL News

Vol. 2 No. 6 STATE OF UTAH DEPARTMENT OF SOCIAL SERVICES DIVISION OF HEALTH June 1974

DDT BLOOD RESIDUES DECLINE

For the past seven years the Utah Community Pesticide Study has been monitoring pesticide levels in the blood of the general population. It has been found that very small amounts of DDT are present in everyone's blood and the levels tend to be highest in older people, probably due to a longer exposure period. It has also been established that men have slightly higher levels of DDT than do women.

The Utah Study also points out that it has been unable to show adverse health effects from pesticide blood levels. This finding applies to those with high exposure rates due to their occupation, which includes farmers, mosquito abatement workers, pest control operators and others, as well as the general population.

Although levels of DDT and dieldrin, another pesticide, do tend to

continued page 4

Girl Scouts planting bare-root trees in empty milk cartons for later transplanting in a Girl Scout Grove on Kennecott properties in the Oquirrhs.

Kennecott Copper Re-Vegetation Plan for Oquirrh Mountains Underway

For the past fifteen years Paul Rokich, a botanist from the University of Utah has been studying the vegetation of the Oquirrh mountains. During that period he gained the reputation as the man who knows the vegetation of that area better than anyone else. Early in 1973 the Kennecott Copper Corporation employed Larry Jones, a forestry graduate from Purdue University, to team up with Rokich in an effort to revegetate the denuded area of the Oquirrh range.

The project seems distined for success because in recent years native plants have returned to some of the areas that had been denuded by logging, burning, over-grazing and early copper smelter gases. Also some wildlife has returned to the north end of the range and the area has come to look more like it did when John Muir first saw the

continued page 3

OQUIRRH MOUNTAINS

(continued from page 1)

Oquirrhs in 1877.

The natural changes that have taken place were brought about by improved control of sulfur emissions from the Kennecott stacks and the termination of other detrimental activities.

The revegetation program was started last year with the replanting of old cuts and tailings pile dikes. Three hundred acres of Japanese millet was planted on tailings piles to help stabilize the surface and reduce dust problems. Aerial seeding was done in Smelter Canyon to reduce erosion and prevent flooding. Also a thousand acres of heavily eroded canyon face was aerially seeded with seven tons of a special grass mixture. Shrubs and trees are being planted in a further effort to control dust and erosion and protect the watershed area.

The Kennecott team has received help from various sources such as a Girl Scout group who helped plant 3,700 shrubs and 700 trees in March of this year. Brighton High School students also pitched in to help plant "Paul's Mountain" as they call the Oquirrhs. Official agencies helping with the project are the U. S. Soil Conservation Service, the U.S. Forest Service, the Utah State Division of Forestry and Utah Division of Wildlife Resources. The Utah Nature Study Society as well as several conservation groups have been on hand to inspect the operation.

In response to frequent requests to talk to school groups the Kennecott revegetation team has developed what they call "tailgate ecology". They arrive at the school with a pickup truck partly filled with dirt. Students scoop dirt from the open tailgate for planting bare-root trees in milk cartons. These small trees are then replanted in special groves on Kennecott property.

The environmental impact of Kennecott's program is already noticeable. Progress is expected to continue due to the efforts of people associated with the project and also because a further reduction in sulfur emissions is being planned.

NUCLEAR BOARD

(continued from page 2)

problems inherent in the use of nuclear energy.

Another part of the business conducted during this year's meeting was the development of a resolution to the Joint Committee on Atomic Energy. The resolution asked for the inclusion of wording in the bills concerning uranium tailings piles, now in Congressional Committee, to provide for stabilization, removal and relocation as well as remedial action to be taken if tailings piles have been used for construction.

Another topic under consideration by WINB members was the current lack of long-range plans for high level radioactive waste disposal in the United States. It was acknowledged that the U. S. Atomic Energy Commission has investigated several methods for disposing of radioactive waste materials such as underground burial, storage as liquid in tanks and as solids in surface storage sites. These disposal methods were discussed in depth and a report will be compiled within the next year.

During the course of the meeting the total energy problem was discussed including nuclear, geothermal and coal fired methods of electrical power generation. The benefits and problems of the Alaskan pipeline, the gasification and liquification of coal, and the processing of oil shale and tar sands were considered at length. Further studies on these subjects will be conducted over the next year and recommendations will be made to the proper authorities for possible solutions to some of the problems inherent in energy production.

STEPHEN E. MOEHLMANN TO CONDUCT CONTINUING WASTE WATER TREATMENT PLANT OPERATOR TRAINING COURSE

Stephen E. Moehlmann is the most recent addition to the staff of the Utah State Division of Health, Bureau of Environmental Health. Steve and his wife Marilyn recently moved to Salt Lake City from their home in Cedar Rapids, Iowa.

Mr. Moehlmann earned a B.S. degree in General Science and an M.S. degree in Environmental Engineering from the University of Iowa. He also holds an Iowa Grade I water and wastewater treatment plant operator certificate and has had several years experience in both culinary and wastewater treatment plant operator training. His past experience includes one year spent in training culinary water treatment plant operators at Kirkwood Community College in Cedar Rapids. More recently he spent one year in Ramstein, Germany, where he trained wastewater treatment plant operators.

Steve's major responsibility in his new position is to develop and implement the continuing wastewater treatment plant operator training program that has been in the planning stages for several months. It is sponsored by the Utah State Division of Helath which is fully committed to the training course and has already conducted two forty-four week training sessions.

One of the first phases of the new program will be between a forty and fifty-week classroom, on-the-job training course scheduled to begin in September. The total program is designed to meet the needs of all Utah wastewater treatment plant operators and the goal is to attain 100% training.

Calvin K. Sudweeks, Chief of the Water Quality Section said, "The

continued page 4

Exhibit XIX

The Youth Employment Program

Under the Youth Employment Law of 1973, Utah Copper Division hired ten teenagers (14-17) through Salt Lake County's Youth Services Division to work during the month of August in the revegetation program. Under the supervision of Rokich and Jones, the students participated in planting projects in Coon Canyon, Little Valley and Kessler Canyon.

The Deseret News (Wednesday, July 31, 1974) ran a brief story on the hiring of the students, and KSL-TV (August 5, 1974) ran a 90-second film story on their first day on the job, planting oak trees and groadcasting grass seed in Coon Canyon. The Deseret News later (August 16, 1974) ran an editorial on the activity called "Jobs for Utah Youngsters."

Kennecott's participation in the hiring of teenagers was praised in a speech by Gov. Calvin L. Rampton, read by Milt Weilenmann, Director of Development Services, at the luncheon meeting of the 25th Annual State Economic Development Conference at the Hotel Utah, Wednesday, August 14, 1974.

Another August activity related directly to the revegetation program was a tour by Dr. Walter P. Cottam, the eminent botanist who had initally inspired Rokich's revegetation work, and his "Thursday Outing Group." The outing was covered in a fall issue of Kennescope.

Tailings Cover planned

Ten teenagers, ages 14 through 17, will begin work Monday planting seeds and seedlings in the Oquirrh mountains behind Kennecott Copper Corp.'s smelter in Magna.

The youths, including two or three girls, have been selected by the Youth Services Division of Salt Lake County and will receive $2 rer hour for 32 hours per week. The project will continue until school starts.

The county will pay the youths and Kennecott will reimburse the county at the end of the project. Kennecott also will provide supervision, equipment and materials.

The youths will be under supervision of Paul Rokich, environment specialist at Kennecott, who has been revegetating the mountains since 1956.

COMM/2Aug74/KEK
cc:BBS

Comment

DESERET NEWS, SALT LAKE CITY, UTAH — FRIDAY, AUGUST 16, 1974 — A 5

Jobs for Utah youngsters

While the work ethic is deeply ingrained into the vast majority of adults, many youngsters unfortunately have been "turned off" by the whole idea because of their inability to get a job.

Fortunately, that condition is slowly changing as more and more firms come to realize the advantages of hiring enthusiastic youngsters for part-time or summer jobs.

With the opening of school rapidly approaching, now seems a good time to review experiences of the past summer in youth jobs and perhaps lay some groundwork for next year.

Many employers are unaware of a bill passed by the 1973 Utah Legislature which moved to liberalize conditions under which youngsters could be employed. But happily, some firms are seizing the initiative in providing more youth jobs, with plans to hire more next year.

Kennecott Copper is one firm implementing the new law. This summer it hired 10 youngsters, ages 14 through 17, to plant seedlings and vegetation and generally to reseed the denuded Oquirrh Mountains. It plans to expand the program next year.

Other employers should make note of that fact in planning their employment budgets for next year. For, as Governor Rampton noted in a message delivered this week to the Economic Development Conference at Hotel Utah:

"I think you will be pleasantly surprised at the willingness of these youngsters to work and at the pride they have in their work."

COMM/16Aug74/KEK
cc: BBS

.Kennescope

Published by
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Utah Copper Division
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Revegetation revisited

WHEN PAUL ROKICH was attending the University of Utah, much of his motivation toward replanting the Oquirrh Mountains came from Dr. Walter P. Cottam, professor of botany and one of the foremost botanists in the country.

Rokich had the dream; Cottam gave him practical pointers on how to revegetate the denuded and stark north end of the Oquirrhs.

Dr. Cottam has made periodic checkups on his former student, and has offered advice when asked.

As a somewhat formal inspection of what has transpired ecologically in the Oquirrhs, Rokich recently invited Dr. Cottam and members of his "Thursday Outing Group" to visit, including Utah Supreme Court Justice Albert H. Ellett, Vard Jones of the *Salt Lake Tribune,* Maxine Martz of the *Deseret News,* and Jan Johnson, coordinator for the Utah Environmental Center. Several wives also attended.

Also in the group were Paul Tayler and Larry Jones (PC&E) and Verne Huser (communications) of Kennecott. Mrs. Cottam and Mrs. Rokich turned the outing into a gourmet's delight with their lunch preparations, and Paul's son Ted, a budding botanist, helped with the cleanup.

After viewing various plantings at the smelter entrance, the Bonneville concentrator and tailing pond dike, observing results of the aerial seeding in Smelter Canyon and tree-planting on the catchment dike behind the smelter, the group visited Coon Canyon for a lunch of elk steak, corn on the cob, salads and fruit.

Later the group drove to the summit of Coon Peak to survey the Oquirrhs from the highest point in the north end of the range.

Dr. Cottam, who had seen Black Rock Canyon with virtually no vegetation, was pleasantly surprised to see the canyon well on the way to recovery.

Paul Rokich, left, shows tour group some plantings on the tailing pond dike to stabilize soil and reseed area.

Dr. Walter P. Cottam and Paul Rokich observe profuse vegetation in Black Rock Canyon above the Utah smelter.

Exhibit XXI

First Quarter Report
(1975)

Kennecott Copper Corporation had little good news for its First Quarter Report to stockholders in 1975, but the Corporate office in New York was so impressed with the work that Rokich had been doing in Utah that they devoted a whole page--a quarter of the Quarterly Report--to Rokich and his commitment to the North Oquirrhs and to the division's revegetation efforts.

Paul Rokich and Kennecott: Committed to Make the Hills Green Again

The Oquirrh mountain range is a rugged ridge that separates Salt Lake and Tooele counties in Utah. On the northwest edge of the range, overlooking the Great Salt Lake, lies Black Rock Canyon.

In recent years, over a thousand acres of land in these areas have abounded with new species of grass, trees and shrubs. Animals have returned. Deer, elk and rabbits thrive among olive, maple and fruit trees, wheat grass and sunflowers.

Life and beauty has returned to the area after decades of abuse. In the late nineteenth century, heavy logging, over-grazing, erosion and uncontrolled forest fires severely denuded the mountains. Then, in 1906 a huge copper smelter was erected that spewed sulfur fumes upon what vegetation was left. The smelter later was to belong to Kennecott.

The lush vegetation around the Utah Copper Division today is certainly a product of nature, but more directly reflects the result of years of labor of one man: Paul Rokich.

A botany major at the University of Utah in 1956, Paul Rokich began planting experimental plots of grasses and shrubs in Black Rock Canyon near the smelter, trespassing on Kennecott property to do his work without the knowledge of Company officials.

Personal Financing

No one financed the early years of Mr. Rokich's plantings. He worked in the heavy construction industry during the day to earn money to purchase seedling trees. The tree-planting business was a sideline he pursued in the middle of the night.

In 1960 Mr. Rokich exhibited his experimental efforts to Kennecott officials who gave him permission to continue his efforts. Although he was allowed to continue to conduct his experimentation on Company property, he received no support or assistance. However, his plantings were watched with continuing interest. The experimental plantings began to spread beyond his neat rows and sample plots, scattering vegetation throughout the Oquirrh mountains.

Dr. R. J. Heaney, head of the environmental section at the Utah Copper Division, who had given Mr. Rokich the go-ahead years earlier, fully committed the division to a revegetation program early in 1973 and hired him as an environmental technician on the Kennecott staff.

Paul Rokich, Kennecott Employee

Projects were immediately implemented by Mr. Rokich, now a member of Kennecott's environmental team:

—Experimental plantings of Japanese millet were made on the tailings pond (waste material from the concentrators) to demonstrate its growth capacity. Later, extensive plantings were made on the tailings pond to prevent dust from blowing.

—Seven tons of a special grass mixture developed by Mr. Rokich were planted by helicopter over a thousand acres in an aerial seeding project.

—Volunteer groups of Boy and Girl Scouts and students were organized through "tailgate ecology programs" to participate in the planting of trees and shrubs on the Oquirrh mountains.

—A tree farm was set up on Kennecott property in Tooele County to provide trees for transplanting into various revegetation sites.

—At the Bonneville concentrator, crews groomed the terrain and planted varieties of crested wheatgrass in efforts to provide a suitable cover with low susceptibility to fire during the critical summer period.

Kennecott was doing its part as well to improve the environment during the free-lance days of Mr. Rokich. As technology developed, acid plants were built to considerably reduce the sulfur emissions from the smelter. "When the new smelter begins operating, that mountain will take off; it will bloom like a rose," predicts Mr. Rokich, referring to Kennecott's $175 million pollution control program scheduled to be fully implemented in 1977 at Utah.

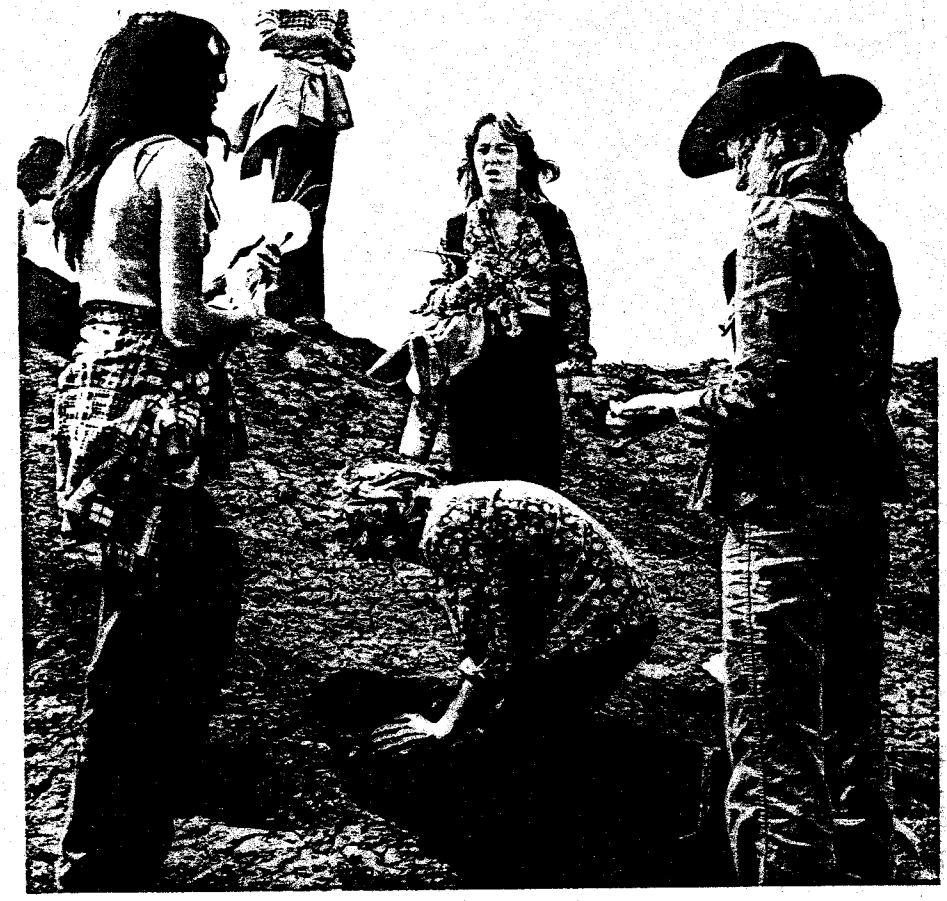
What have been the rewards? "The greatest thanks I get is seeing these plants grow," answers the botanist. "I can feel it. I'd do it all over again, if I had the chance."

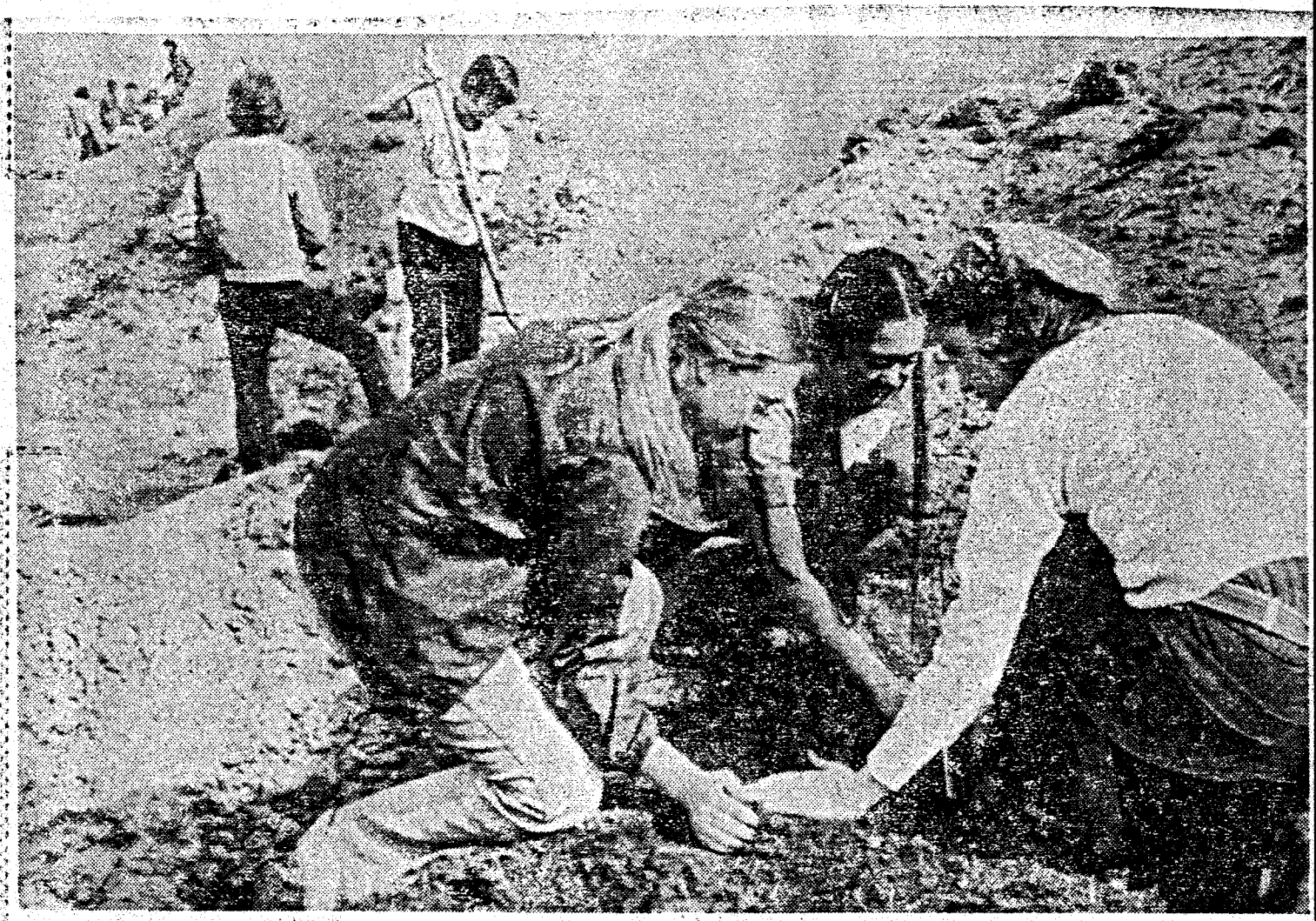
In December of 1974 Mr. Rokich received the Nature's Trustee Award of the Utah Environment Center, honoring the state's outstanding environmentalist. On its editorial page, the Ogden *Standard-Examiner* commented that the award had gone to "a most deserving man—Paul Rokich, the 'Johnny Appleseed of the Oquirrh mountains.' All of Kennecott's employees, from bosses to bulldozer operators, have become his allies. The Oquirrhs may become green again—thanks to Kennecott's own program of reducing pollution from the smelter and to the dedication to improving the environment demonstrated so forcefully by Paul Rokich."

Exhibit XXII

Earth Week--1975

Kennecott's Utah Copper Division cooperated with the Utah Environment Center to provide a meaningful activity for junior and senior high school students during Earth Week in late April. The division revegetation team supplied thousands of trees for the students to plant in Little Valley as part of Utah's Bicentennial program "A Million Trees For A Million People." The Deseret News (April 23) and the electronic media covered the activity in some detail.





Deseret News photo by O. Wallace Kasteler

Vicky Samuel, Patty Ogura and Barbara Moore tamp in one of the 7,000 seedlings in Oquirrhs planting project.

Tree project branches out

Utah's "Million Trees" project has taken root and is branching out within the state.

A Bicenntennial project of the Deseret News and Utah State Institute of Fine Arts, "A Million Trees for A Million People" has a goal of one million more trees in the state by September 1976.

That goal will be closer to reality by 7,000 trees as a result of a Utah Environment Center's project Tuesday and today. Young workers with shovels stormed the slopes of the Oquirris west of Salt Lake, planting trees.

Eight species of trees and ground cover will have been planted in the Little Valley area by Wednesday afternoon, according to Jan Johnson, executive director, Utah Environment Center.

"We planned two days of planting 7,000 trees in a massive revegetation program," she explained. On Tuesday, approximately 90 students from East, Brighton, Master Academy and Boys Ranch were bused into the area for a day-long planting project. An additional 90 from Kearns Junior High School were scheduled for Wednesday, she said.

"We planned the project for three purposes — for the 'Million Trees' campaign, in observance of Earth Week and for the Festival of Arts for the Young," the executive director added. The latter is to show aspiring young artists that they should protect the environment, thereby providing artists, poets and authors something to paint or write about.

The Utah Environment Center is cooperating with Kennecott Copper Corp., which is providing the 7,000 trees, in a revegetation program on the slopes.

Some of the blame for the condition of the mountains was placed on early settlers who removed trees for building homes and then allowed sheep and cattle to overgraze the land.

Trees planted Tuesday and today included black locust, bladderscena, Douglas fir, European sage, Rocky Mountain juniper, Russian olive, Scotch pine and Siberian pea.

Meanwhile, Utahns were urged by the governor this week to return pledge cards so that a running tally can be made.

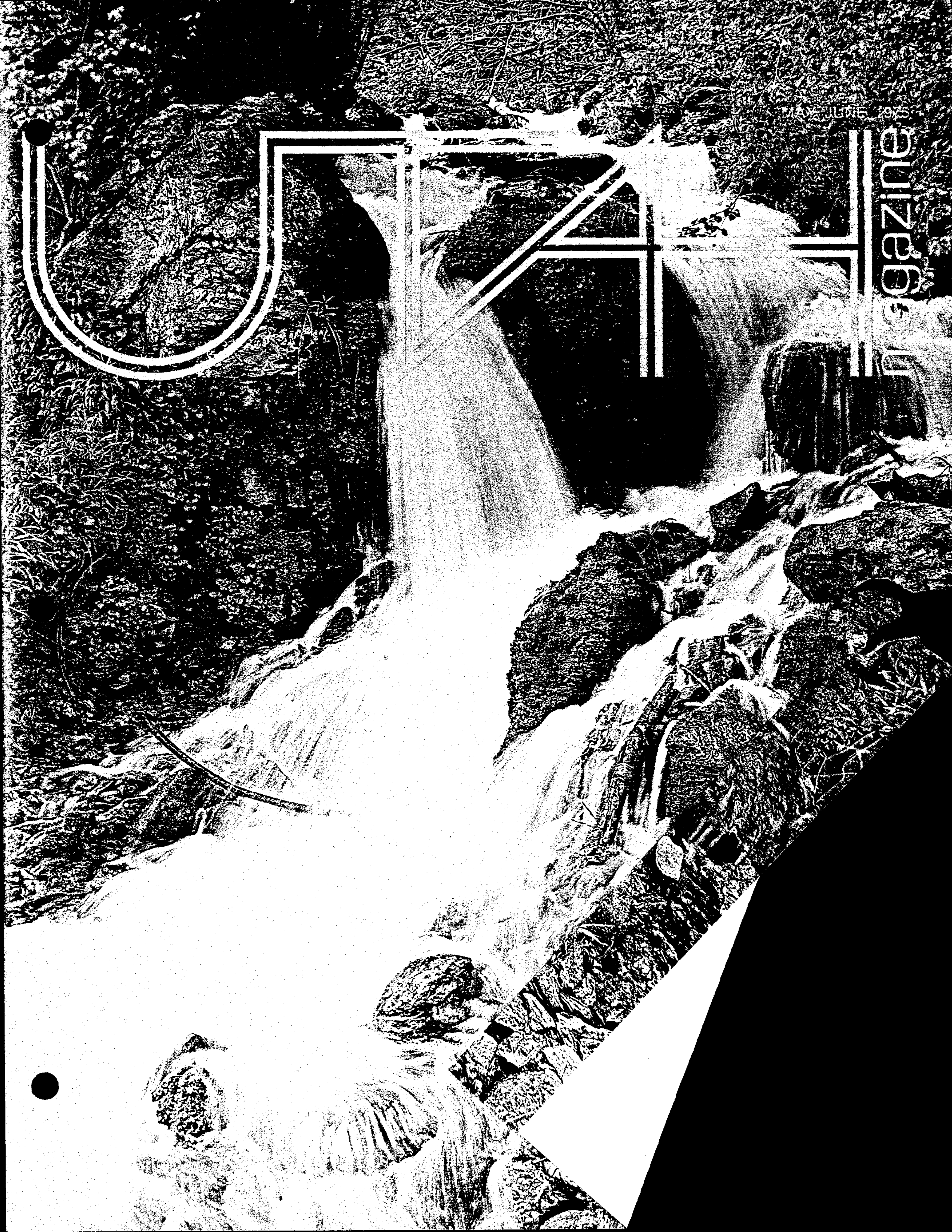
Gov. Calvin L. Rampton autographed six caricatures of himself as "Cal Appleseed" (see picture). The six signed art works will go as prizes to persons or groups who contribute significantly to the tree-planting effort.

Exhibit XXIII

Utah Magazine Article

The May-June issue of Utah Magazine carried "The Paul Rokich Story" as a main feature in its Environmental Issues column by Verne Huser, who is also Utah Copper Division's environmental communications specialist.

Rokich is shown here with environmental field engineer Bob McKee and University of Utah professor Chuck Wullstein on a tour of one of the revegetation projects on the tailing pond dike where the Kennecott program may offer answers to strip mining problems.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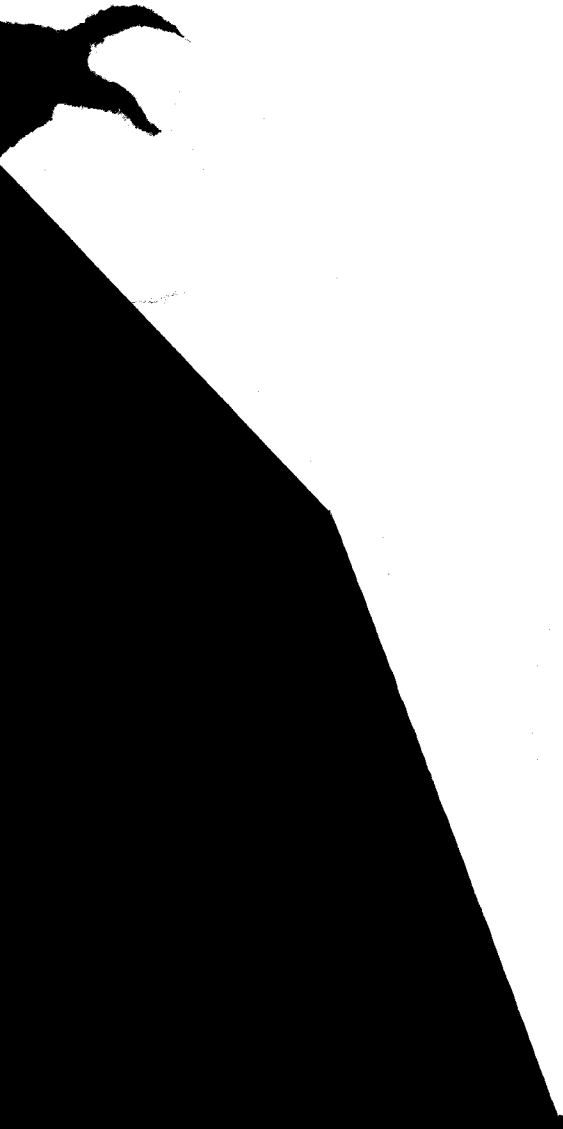
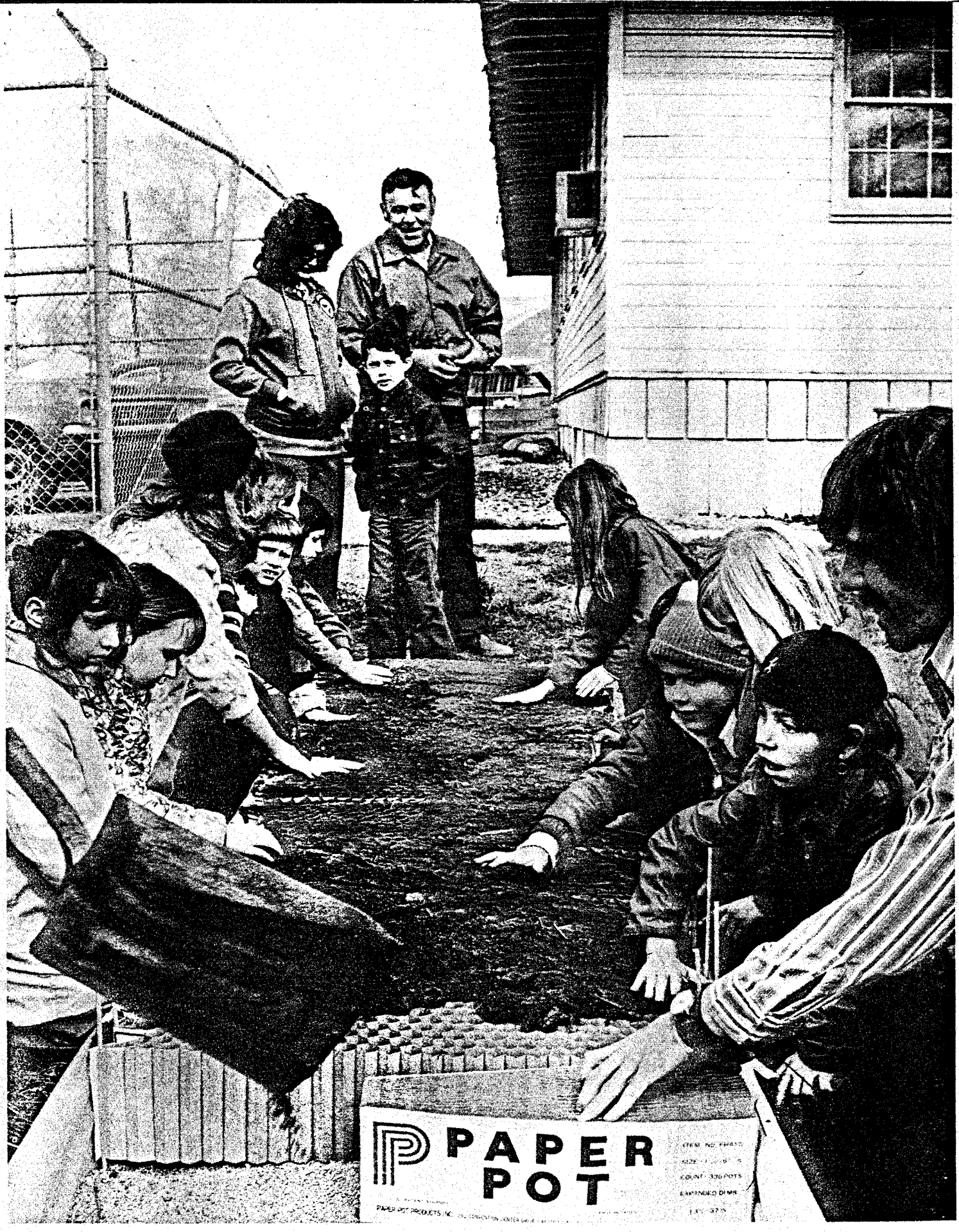




Paul with Girl Scout leader, Girl Scouts and Brownies planting seeds under the direction of forester Larry Jones (right, forefront).

The Paul Rokich Story

Photos and text by Verne Huser

Paul Rokich is a big man, but he is gentle. Working with a group of Girl Scouts, explaining to them how a seed becomes a tree or a shrub and how that plant helps to hold the soil on a mountainside, he is kind and careful, but most of all he is gentle. He is a powerful man, rugged as the mountains in which he works: the Oquirrhs, a ragged ridge of rock that separates Salt Lake and Tooele counties. He is strong and active, carrying heavy sacks of seed or a hundred seedling trees to plant high in the range that he has adopted as his own, but here too he is gentle, walking carefully on the land he has been planting for nearly twenty years in an attempt to help it recover from the ravages of man.

Rokich has tremendous faith in plants, in the natural growth processes; he knows and understands them. He has the patience of Job, the dedication of Brigham Young, the devotion of Sancho Panza.

An historian as well as a botanist, Rokich recalls John Muir's visit to the north Oquirrhs in 1877 as recorded in Muir's book *Steep Trails*. Paul writes "The following years brought heavy demands for lumber and forage, and range fires burned uncontrolled from canyon floor to peak," destroying much of the natural vegetation that Muir had discovered.

Logged off and overgrazed and frequently burned by natural and man-caused fires, the north Oquirrhs had been seriously denuded before the smelter smoke in the first decade of this century added the *coup de grace*.

For fifty years little grew in the north Oquirrhs near the smelter. In 1956, five decades after the smelter began operation, Rokich first encountered Dr. Walter P. Cottam, eminent botanist at the University of Utah, in an ecology course — in the days before *ecology* had become a household word, the meaning of which few people know today even though it *is* a household word.

Cottam so inspired Rokich that the budding Johnny Appleseed began planting experimental plots of grasses and shrubs in Black Rock Canyon near the smelter — without the knowledge of company officials.

Of Rokich's efforts, Dr. Cottam says, "I encouraged him in this project and suggested that he might spend a summer session setting up some pilot studies for which I would grant him credit. He labored far beyond my expectations — planting several hundred trees and shrubs of various kinds and laying out several experimental grass plots, all at his own expense."

Meanwhile, good things had been happening at the smelter. In 1946 sulfuric acid plants began to be built, initially to make acid for use in various copper-extractive processes but later to control air pollution. In 1959 Kennecott Copper Corporation bought the smelter from American Smelting and Refining Company.

In 1960 Rokich brought to the attention of Kennecott officials the work he'd been doing surreptitiously in Black Rock Canyon just west of the smelter, a canyon frequently bathed in the sulfurous plume. Dr. Robert J. Heaney, head of the Utah Copper Division's environmental section, liked what he saw and arranged for Rokich to have permission to continue his experimental work.

During the Sixties, Rokich continued to plant — grasses, forbes, shrubs, trees, both native and exotic species — in his ever-expanding efforts to return vegetation to the Oquirrh Mountains. There were numerous failures, a few successes, but Rokich perservered. He saw a thousand fir seedlings he'd planted go up in smoke as a fire started by a careless sheepherder swept the canyon. Weather conditions — especially the hot dry summers, ocassionally gully-washing thunderstorms — didn't help matters, but Rokich kept trying.

After Cottam's retirement, Dr. Kimball Harper, initially at the University of Utah but later at Brigham Young University where he heads the Department of Botany and Range Science, had begun to work with Rokich. He too was impressed with the work being done in Black Rock Canyon. In a letter dated July 22, 1971, he wrote:

> "I have found Paul to be well versed in plant materials (both native and exotic), revegetation techniques and wildlife ecology. He obviously is a devoted conservationist of unbelievable energy. I went to Black Rock Canyon expecting to see a few plantings of one or two species. Instead, I saw literally *hundreds* of plantings of over a score of species. Paul's well-kept records of each planting show that his 'labor of love' has spanned approximately one-and-a-half decades. It is my understanding that all that work has been done in his spare time and at his own expense. I know of no comparable case anywhere else! Where only bare hillsides once existed, Paul has

(continued on page 10)

established swards of grass, groves of trees, thickets of shelter and food shrubs. Signs of big game, upland game birds, and small mammals were everywhere in evidence around the revegetated spots. Few professionals can show more proof of their success."

As new sulfuric acid plants were added to the Kennecott smelter operation to control sulfur emissions, Rokich began observing changes in the vegetation patterns, especially in 1967 and 1970 when massive new plants went into operation. Rokich began experiencing success after success: plants that hadn't responded for a decade began to grow, and areas that had remained barren for half-a-century suddenly became garden spots.

Dr. Heaney, Kennecott's environmental engineer, began pushing for a company-sponsored revegetation program, and in the spring of 1973 Kennecott's Utah Copper Division employed Rokich, teaming him with forester Larry Jones, who had earned a Masters Degree in stabilizing tailing ponds. In May the two initiated a multifaceted broad-spectrum program based on years of research and the latest technology, a sound combination.

The team soon began using volunteers: a Boy Scout group helped plant trees on a flood-control dike immediately behind the smelter; a group of Girl Scouts and Brownies spent a Saturday morning planting 3600 shrubs and 700 trees in milk cartons and special nursery plots for later transplanting on Kennecott properties; students from the HIP (Highly Involved Persons) Program at Brighton High School spent several days transplanting these shrubs and trees on sites behind the smelter where growing conditions were favorable.

Rokich and Jones began planting Japanese millet on the tailing pond, a mere two acres initially in an experimental project that was so successful that they're planting 300 acres this year. During their second spring, Rokich and Jones conducted an aerial seeding project, planting by helicopter seven tons of a special grass mixture developed by Rokich on a thousand acres of eroded mountainside. The years of experimental planting and species testing that Rokich had done on his own were beginning to pay off — for Paul, for Kennecott, and for the Oquirrh Mountains.

During the summer of 1974 — the hottest, driest summer in decades — Dr. Cottam revisited Black Rock Canyon with Rokich. When he'd first seen the area, it had been more of a moonscape than a part of this earth. Now it was rich in vegetation once more. The botanist remarked time and again: "This is wonderful, Paul; this is wonderful." He could hardly believe the changes that less than two decades had brought to the north Oquirrhs.

That fall the University of Utah Arboretum Guild, after seeing a slide presentation on the work Rokich had done in less than two years at Kennecott, proposed that the Utah Environment Center's Nature's Trustee Award go to Rokich. There were several other nominees, but Rokich's work over the years was so impressive that when the UEC held its second annual awards dinner in December, Paul Rokich was named recipient of that pretigious award.

A local television station reported it like this: "Paul Rokich, a native Utahn who has spent most of his life on the barren slopes of the Oquirrh Mountains, has tonight received the Nature's Trustee Award of the Utah Environment Center:

> The Award honors Utah's outstanding environmentalist, and this year it went to Rokich. Rokich has been working on revegetating the Oquirrh Mountains near the Kennecott Copper operation. Born in a mining tent at the smelter where his father was employed, Rokich spent his early years on the mountains that were suffering from overgrazing, pollution and erosion. Working on his own, Rokich began his research planting a variety of grasses and trees to see what kind of vegetation would grow in the area. Later Kennecott hired the ecologist to oversee a massive replanting project on the mountain. In the past year, high school students, Boy and Girl Scouts, and numerous others have aided in the work. Thousands of trees and shrubs have now been planted on the mountain side."

Both Salt Lake dailies covered the event, and the Ogden *Standard-Examiner* commented editorially: "The 1974 'Nature's Trustee Award' of the Utah Environment Center has gone to a most deserving man — Paul Rokich of Hunter, the Johnny Appleseed of the Oquirrh Mountains. . . . The Oquirrhs may become green again — thanks to Kennecott's own program of reducing pollution from the smelter and to the dedication to improving the environment demonstrated by Paul Rokich."

In his efforts over the years — when he was on his own and since he has been working for Kennecott — Rokich has worked closely with numerous people at the various universities throughout the area, with personnel in state and federal agencies, with environmental and educational groups.

One of the recently developed projects is the Tailgate Ecology Program in which Rokich and/or Jones goes to a school with a pick-up truck partially loaded with soil and a supply of seeds or shrubs or bare-root trees, which students then plant in empty milk cartoons brought from home. The planting takes place right on the tailgate of the truck, thus the name, but the students can watch the plants grow, learning about ecological patterns. Later the shrubs and trees are transplanted on Kennecott properties to help revegetate the Oquirrh Mountains. These plots are named for the schools whose students did the initial planting.

Rokich has a lot of help now, but in the early days "Everybody thought I was crazy," he says. "My work is just about over," he continues philosophically. "When the new smelter begins operating, that mountain's going to take off — it'll bloom like a rose. All it needs is a little time and a little seed. Our biggest problem now is taking care of what we've got, developing land use patterns that will prevent future destruction — not only at Kennecott but throughout the state and the nation."

Paul Rokich in Kennecott greenhouse at U. of U.

Ehxibit XXIV

The Ernest H. Linford Column

On Monday (June 9, 1975) in his regular Monday Morning Environmentalist column for the Salt Lake Tribune, Ernest H. Linford devoted most of his copy to the Kennecott revegetation program. He said in part, "The remarkable stands of trees and other greenery will serve to memorialize both human dedication and corporate responsibility," a tribute to Rokich's efforts individually over the years and to the Utah Copper Division's efforts as a company since May 1973.

Rehabilitation of Our Eroded Landscape Growing

By Ernest H. Linford

While civilization's encroachment threatens some plants, notably species of wildflowers in the Middle West, as well as animals, this is being offset by rehabilitation of ugly scars on the landscape.

Mr. Linford

A spinoff from the hundreds of successful conservation programs is a growing movement to create or enlarge burial memorials.

Although memorial grove programs have existed since 1921, the movement is receiving new impetus now by Friends of the Earth who are promoting the plan of burial trusts. The trust provides for the purchase of a small natural area as a substitute for the more traditional burial plot in a traditional cemetery.

Oquirrh Memorial

"The purchaser and his or her heirs can use the area in perpetuity as a repository for ashes, or simply for memorial purchases, says the magazine Not Man Apart.

"Following generations can hike into such spots, and, in these natural cathedrals, establish ties with their past . . . Thus a beautiful spot on earth can be permanently preserved to tie each generation to the next."

Institutional arrangements have to be made for such a program, but the alternative to the "American Way of Death" is certainly in harmony with man's growing perception of his relationship to nature.

The spectacular greening of several canyons in the Oquirrh Mountains overlooking the Great Salt Lake is not a part of the memorial grove plan but the remarkable stands of trees and other greenery will serve to memoralize both human dedication and corporate responsibility.

Nearly 2,000 acres of land in Black Rock Canyon near the Kennecott copper smelter and adjoining Kessler and Smelter canyons now abound with a variety of trees (including Douglas fir, Rocky Mountain juniper, black locust, Russian olive, maple and even some fruit trees) many species of bushes and grasses.

The cold, wet spring may have been a disaster for fruit growers and several other forms of agriculture and industry but the slopes back of the smelter have never been so lush in 50 years.

In the late 19th Century these slopes were denuded by heavy logging, overgrazing and uncontrolled fires. Then after 1906 sulfur fumes from the copper smelter administered the coup de grace to what little vegetation was left.

Few resident of the Salt Lake and Tooele valleys are aware of it, but the first acid plant which started removing some sulfur from the smelter's smokestacks was buiot in 1916. When Kennecott bought the enterprise in 1959 it launched a long-term program to further reduce destructive sulfur dioxide fumes. It now has a multi-million-dollar pollution control project under construction.

When Paul Rokich, then a botany major at the University of Utah, started experimental plantings in barren Black Rock Canyon in 1956, there seemed reason for believing him "off the beam."

Rokich worked with heavy machinery on a 9-to-5 job daytimes and then spent his free time, often at night, as a trespassing "Johnny Appleseed" on the barren smelter property. Though fires, floods and other untoward events repeatedly wiped out early plantings, he persisted. And by 1960 he had enjoyed enough success so that he appeared before Kennecott officials and told them of his clandestine experiments.

Hired in 1973

Mr. Rokich was given permission to continue his project but he received no official help from Kennecott until 1973. That year Dr. R. J. Heaney, head of the environmental section of the Utah Copper Division, hired Rokich as an environmental technician. Now, working mainly with Larry Jones, forester, who did much to stabilize tailing ponds, he has an enormously successful conservation program under way.

It includes planting 300 acres of Japanese millet directly on tailing ponds (right into the talcum-fine crushed rock itself) growing wheat grasses and alfalfa on tailing pond dikes and in Kessler canyon and in the harsh environment around the new crushing plant.

Seven tons of grass seed mixture, developed by Mr. Rokich were planted by helicopter last year on 1,000 acres of eroded mountainside. The new greenery naturally has attracted deer, elk and other wild animals and a recent census showed 75 species of bords in the area.

Youngsters Involved

Not the least successful element of the program has been the involvement of school children in the planting work.

In Project Tailgate Ecology a pickup truck partially loaded with soil, seeds and seedlings of trees and shrubs is driven to schools in the area. There students plant trees or shrubs in empty milk cartons, later transplanting them to the Oquirrhs. Thus the young people are enabled to watch the plants frow and serve to stabilize mountain slopes.

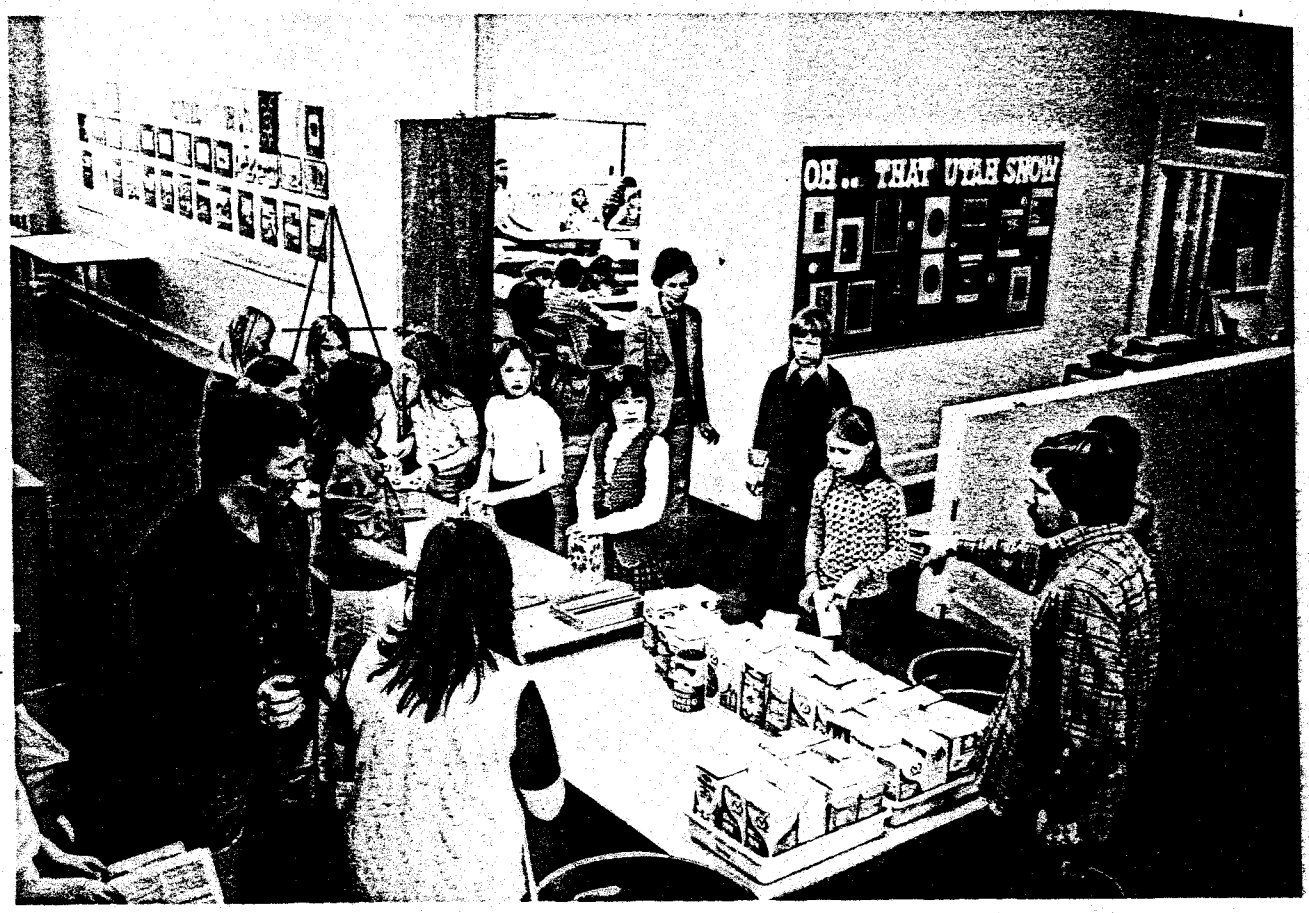
As a new sulfur-removal machinery goes into operation at the smelter in the next few years, Mr. Rokich predicts, "that mountain's going to take off . . ." Then the big problem will be "taking care of what we've got, developing land use patterns that will prevent further destruction," not only on the Oquirrh but elsewhere.

The Salt Lake Tribune
First Section Monday Morning, June 9, 1975

Exhibit XXV

Tailgate Ecology

The Tailgate Ecology Program continued to function during 1975 as Larry Jones and Verne Huser visited schools throughout the Salt Lake Area, Jones showing youngsters how to plant seeds in dirt in milk cartons, watch them grow, then plant them on Kennecott properties in the late spring, and Huser presented the revegetation slide show developed by the Communications Department.



Wet Spring proves 'all root' for new plants

A COLD, WET SPRING that seemed to drive people to distraction was good for our revegetation program. Several projects that depend on adequate natural moisture and are enhanced by a delay in the searing summer sun were highly successful this spring.

In Little Valley, where dozens of dikes have been developed by dozers during the past year, the runoff was mild. Drilled grasses behind the dikes and trees, planted during Earth Week by students from several area schools, have received plenty of water.

The tailgate ecology project involving fifth-grade students at Woodstock School also zeroed in on Little Valley where the students recently transplanted legumes they had watched grow in their classrooms. Forester Larry Jones supervised the planting in milk cartons last winter.

At Coon Canyon Ranch below the mouth of Coon Canyon, the division initiated a tree farm in late May. More than 10,000 trees and shrubs were planted during a single week. Douglas fir, Scotch pine, Rocky Mountain juniper, European sage, Russian olive, and several other species are well on their way as a result of round-the-clock attention by Paul Rokich — and the late rains.

On the tailing pond dike, grasses and forbs drilled into the harsh soil have thrived — you can see the narrow green rows as you drive to the plants — and on the tailing pond itself, Japanese millet is responding to the summer season. Had it been planted even a few days earlier, frost would have killed it. But with moisture of the tailing pond to supply water, the exotic grass, which produces an important duck food, will help control the dust.

The division's revegetation team helped students of five Salt Lake area schools celebrate Earth Week (April 20-26) by providing trees for planting in Little Valley April 22 and 23. Kennecott purchased 7,000 trees from the State Forestry Division at Utah State University the previous week, and the students planted 2,000 of them — all bladderscena — on the dikes in Little Valley.

A few of the school children who helped plant trees and shrubs in Little Valley get organized for the day's work. In distance are two dike contours.

Division revegetation team used this outfit to drill Japanese millet seed in the tailing pond. Hardy annual will help control dust storms such as this.

Kennescope

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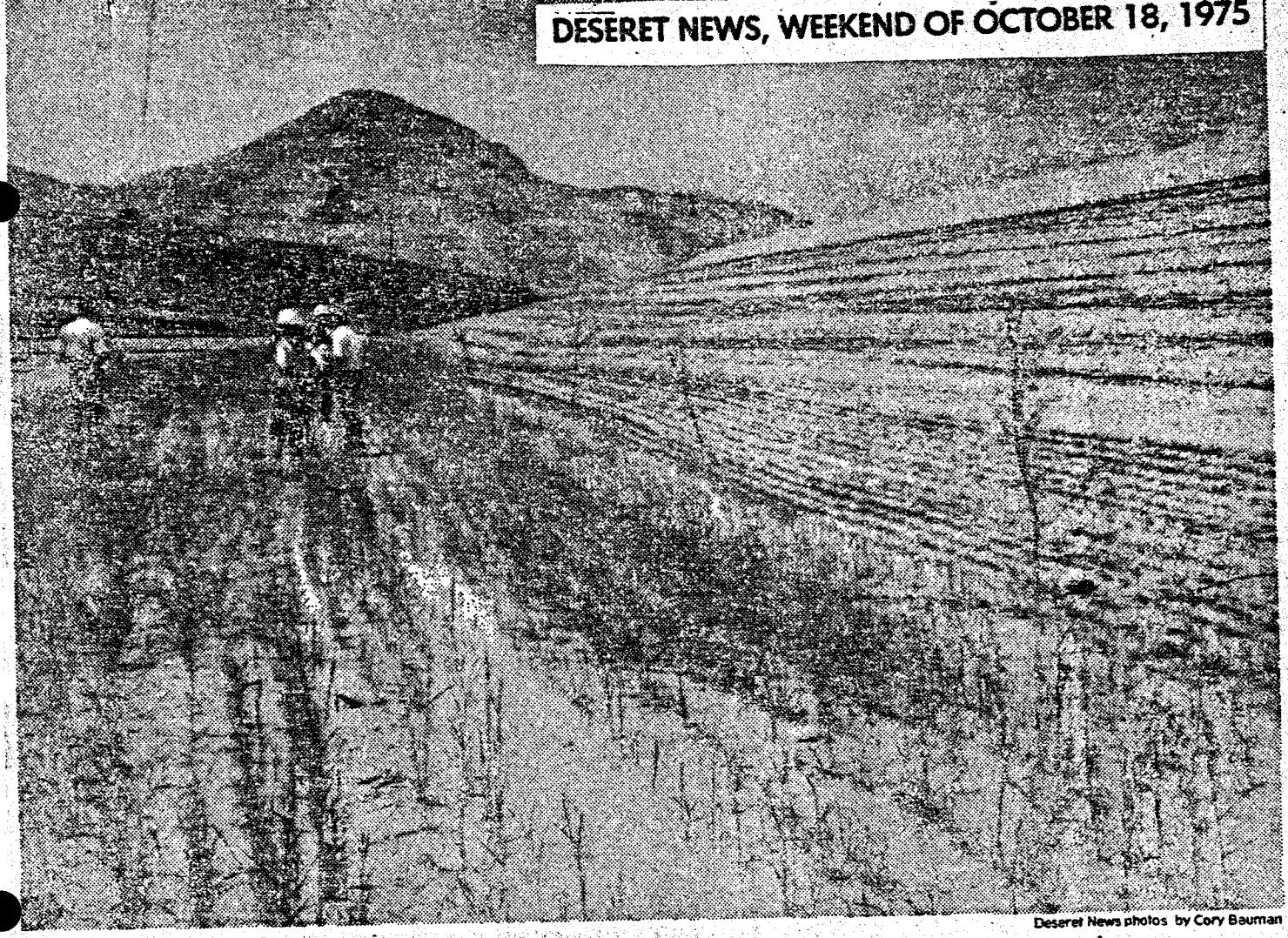
XXVI

The Tree Farm

Utah Copper Division revegetation experts Bob McKee, an environmental field engineer, Paul Rokich, environmental technician, and Larry Jones, forester, planted ten thousand trees during early summer at the Coon Canyon Ranch where they have set up their field headquarters. Irrigated briefly during a dry spell shortly after they were planted, the trees--pine, Douglas fir, Russian olive, locust--and shrubs survived a long hot summer and will be available for transplanting at revegetation sites throughout the north Oquirrhs.

The planting was covered by KSL-TV, and the tree farm has become a regular stop on revegetation tours.



Deseret News photos by Cory Bauman

Workers examine new growth on the edge of Kennecott's tailings pond dike, long a barren mound.

New life on them thar hills

By Joseph Bauman
Environmental specialist

MAGNA — There's not another farmer like Paul Rokich in Utah.

Big, roaring, square-built, Rokich seems almost of mythological proportion. Sitting on his battered tractor with its ecology flag, he's like some latter-day Johnny Appleseed, or a Paul Bunyon in reverse.

Rokich intends to replant the denuded Oquirrh Mountains, exposed gravel railroad cuts, the Kennecott Copper Corp. tailings pond dike, and any other spot of bare rocky ground he can find.

The Oquirrh Mountains are a steep range running north-south in Salt Lake and Tooele counties, from Magna on the Great Salt Lake and on beyond Bingham.

Half a century ago — before logging, copper smelter smoke and overgrazing killed the vegetation — the Oquirrhs had a magnificant natural environment.

The famous naturalist John Muir visited the range in 1877. He wrote:

"Gray sagey plains circle around their bases, and up to a height of a thousand feet or more their sides are tinged with purple, which I afterwards found is produced by a close growth of dwarf oak just coming into leaf.

Paul Rokich inspects new millet.

"Higher you may detect faint tintings of green on a gray ground, from young grasses and sedges; then come the dark pine woods filling glacial hollows, and over all the smooth crown of snow."

Today the mountains are a barren, stark and smoggy wasteland. Logging ended decades ago, with the demise of the forests. Kennecott, owns most of the range around Magna and has phased out grazing.

Kennecott has been reducing air pollution since it bought the smelter in 1959. Today it is working on a $175 million program to cut it back even further. About 93 percent of the visible and 60 percent of the invisible pollutants should be removed from the smelter smoke when the process goes into operation by mid-1977, the company says.

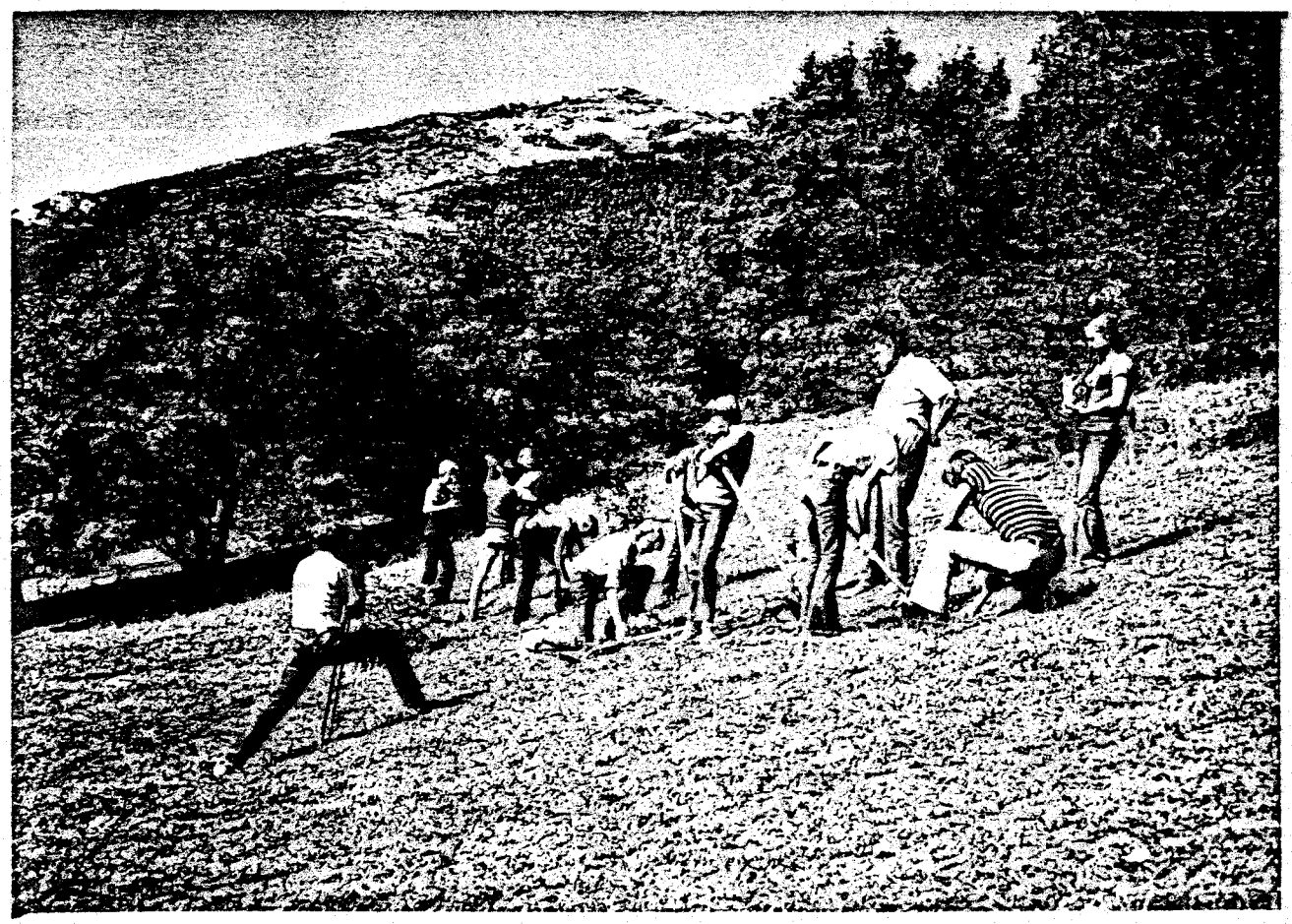
So there's no reason why the Oquirrhs could not flourish again, if plants got started on them.

See NEW LIFE on A-4

Exhibit XXVII

KSL Editorials '75

During Julu 1975 KSL, Inc. twice praised Kennecott for activities at the Utah Copper Division associated with the revegetation efforts. On July 18, L. H. Curtis, President of KSL, Inc., in a radio editorial comment, recognized Kennecott for its implementation of the Youth Employment Law (UCD hired ten students to work in the revegetation again in 1975 as they had in 1974), and on July 21, J. W. Lloyd, Station Manager of KSL-TV, commented on the revegetation efforts.



(284-'75)

Subject: SUMMER JOBS FOR YOUTH (2)

Spokesman: L. H. Curtis, President, KSL, Inc.

Broadcast: July 18, 1975

Earlier this year, a KSL editorial encouraged business and industry to open opportunities for summer jobs for our young people, based on the Utah Legislature's House Bill 33. The Bill defines the kinds of jobs young people can accept and sets the ages, 14 through 18, during which they can apply.

A letter from Mayor Conrad Harrison's office reads in part: "A significant result of KSL's editorial...has been a sequence of job opportunities throughout the Salt Lake area and elsewhere. Without any Federal assistance, a number of prominent corporations have provided work for teenagers....."

Pioneering youth employment was Kennecott Copper Corporation in opening jobs reseeding areas of the Oquirrh Mountains. Trans-World Airways provided jobs at Zions, Bryce and Grand Canyon Parks. Mountain Bell and Mountain Fuel hired a number of young people to beautify their division headquarters for the Bicentennial in 1976 and there were many others. Many Utah communities have hired young people to clean up their parks and other recreation centers toward the same goal.

So, a pat on the back for all those who have done so much for the youth of Utah's communities. KSL suggests that business and industry, both small and large, continue to look for job opportunities for these young people. There's a great deal yet to be done before the summer ends.

(287-'75)

Subject: TREES AND GRASSES AND KENNECOTT

Spokesman: Jay W. Lloyd, Senior Vice President and Station Manager of KSL Television

Broadcast: July 21, 1975

Utah's Kennecott Copper Division has set in motion a program to reseed hundreds of acres of land in the Oquirrh Mountains adjacent to its facility. Employing young people to do part of the work, it is revegetating the land with trees and grasses.

The results of the program are already visible. There are rich grasses, stirrup-high to a tall horse, and thousands of trees that have a firm foothold for the future.

What does it all mean besides a prettier landscape....justification enough for the effort and expense? Well, there's watershed protection against flood damage, there's dust and erosion control, homes for a great variety of wildlife, possible recreational opportunities....hunting, bird-watching, and hiking, to cite just a few. And there's an experimental base for studies in connection with strip-mining scars in other areas.

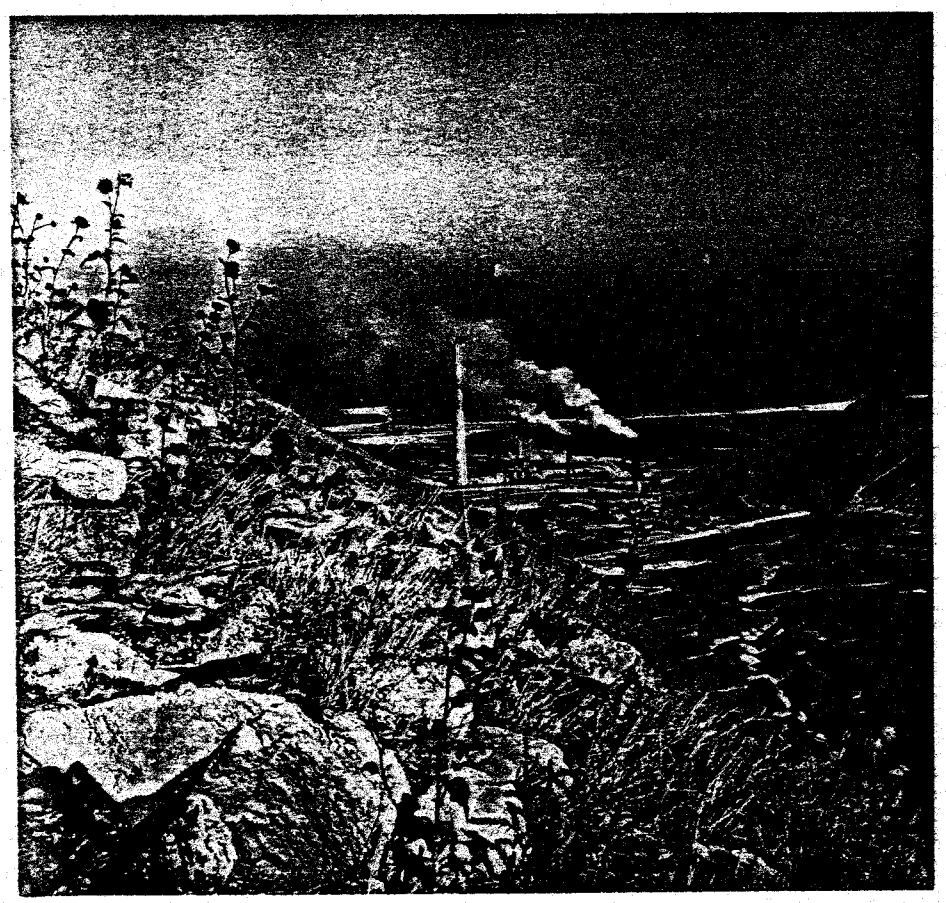
It seems to KSL that this program illustrates how rehabilitation of the environment provides jobs as well as extraction of its resources, and that is the way of the future.

Exhibit XXVIII

National Magazine Coverage

The September-October issue of National Wildlife Magazine featured Paul Rokich in a series called "Where the Action Is" on pages 42-51, referring to Rokich as Utah's Johnny Appleseed.

The October issue of Mining Engineering (pages 54-55) tells the story of Kennecott's revegetation efforts in an article called "The Greening of the Oquirrhs."



National
WILDLIFE
OCTOBER-NOVEMBER 1975
DEDICATED TO IMPROVING THE QUALITY OF OUR ENVIRONMENT

Utah's Johnny Appleseed

AT BILLY'S BAR in Magna, Utah, the regulars have a saying: "Go up the Oquirrhs once with Paul and it's probably his fault. Go up again and there's nobody to blame but yourself."

The Oquirrhs (pronounced o-kers) are a rugged range of rocky hills between Salt Lake and Toole counties. Until fairly recently, the northern end of the range was a lifeless moonscape, ravaged by careless logging, torn by floods and powdered with sooty tailings from a nearby copper smelter. About 15 years ago, a burly botanist from nearby Granger named Paul Rokich began hauling seed, trees and bushes into the desolate region on his back. Rokich's magnificent obsession was to transform Black Rock Canyon and other denuded areas into a lush land fit for man and beast. By now, the 41-year-old father of three sons has very nearly succeeded. And notwithstanding the skeptics at Billy's, Rokich seldom goes up the Oquirrhs alone these days.

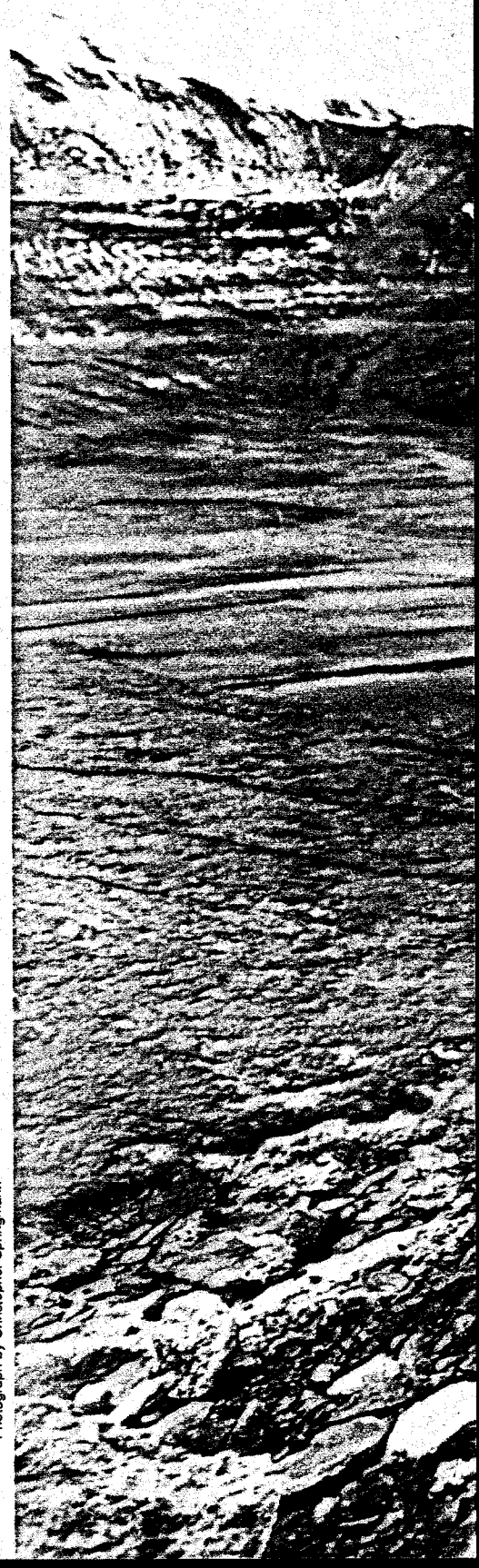
All across the country, more and more people are buying up unimproved rural and wilderness lands with an eye to re-establishing the natural vegetation. Rokich departs from this trend in two important respects. For one thing, the land he has been replanting isn't his — it belongs to the Kennecott Copper Corporation. For another, Rokich has been so relentlessly preoccupied with his planting that, as he himself puts it, "A lot of people think I'm nuts."

Crazy he clearly is not, but Rokich is living out an intense personal vision of what one small piece of the world ought to be. It all began back in 1947, he says, when he went searching for a lost horse in the Oquirrhs. "I'll never forget how stark it was in there," Rokich recalls. "There was not a sound. Nothing was alive. I decided, then, to do something about it." Later, as a botany student at the University of Utah, Rokich read John Muir's descriptions of wildlife and lush vegetation in the Oquirrhs and his determination was refueled.

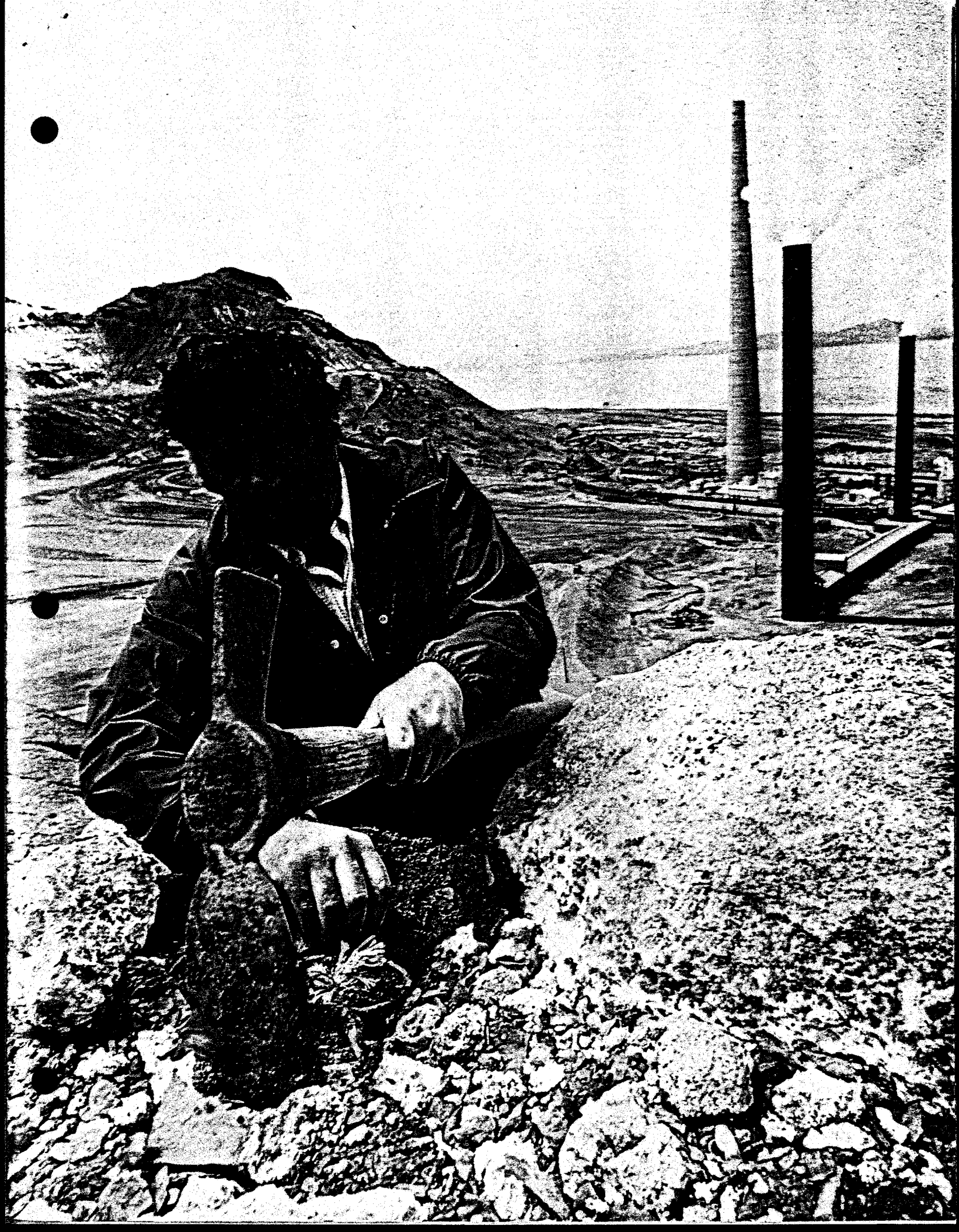
The son of a Yugoslavian immigrant, Rokich embarked on his life's avocation in 1959. Parking his car on the edge of Highway 40, in the dead of the night, he toted seedlings up the steep hills for 16 hours at a stretch. In effect, he was trespassing on Kennecott land, but Rokich didn't look at it that way. Over the years, he borrowed money from relatives to help finance his seed and tree purchases. All the while, he was working as a construction laborer and once he discovered that his family was down to $10 days until the next paycheck. "One of the boys was sick," his wife Ann remembers, "and so Paul spent $5 on medicine. He spent the other $5 on trees."

There were numerous setbacks. In 1960, after planting 3,000 Douglas firs and Ponderosa pines that seemed to be thriving, Rokich found that a careless sheepman had burned off the whole mountainside. "I just stood there and cried," he says. But the softspoken Rokich persevered, risking flash floods, snake bites and rock slides, and gradually the fruits of his labor began to flower. "Paul has established swards of grass, groves of trees and thickets of shelter and food," marveled botanist Kimball Harper of Brigham Young University. "Few professionals can show more proof of success." Further proof came as wildlife gradually began returning to the area: deer, elk and squirrels; chukar partridge and golden eagles; rabbits, mice and songbirds.

Two years ago, Kennecott hired Rokich, teamed him with a professional forester and gave them a mandate to accelerate the revegetation program. Systematically, the two began using local volunteers to man a broad, many-faceted program that is in full swing today. Now, though, Rokich — who has personally planted some 10,000 trees, 5,000 shrubs and hundreds of pounds of grass seed — goes up the Oquirrhs in a corporate truck. He still has the receipt for the first bag of grass seed that he bought for 26c. And he still gets a bang out of what he's doing. Squinting up at the green slopes, he told one recent visitor: "It makes you feel like you've done something important." — *C.S.*

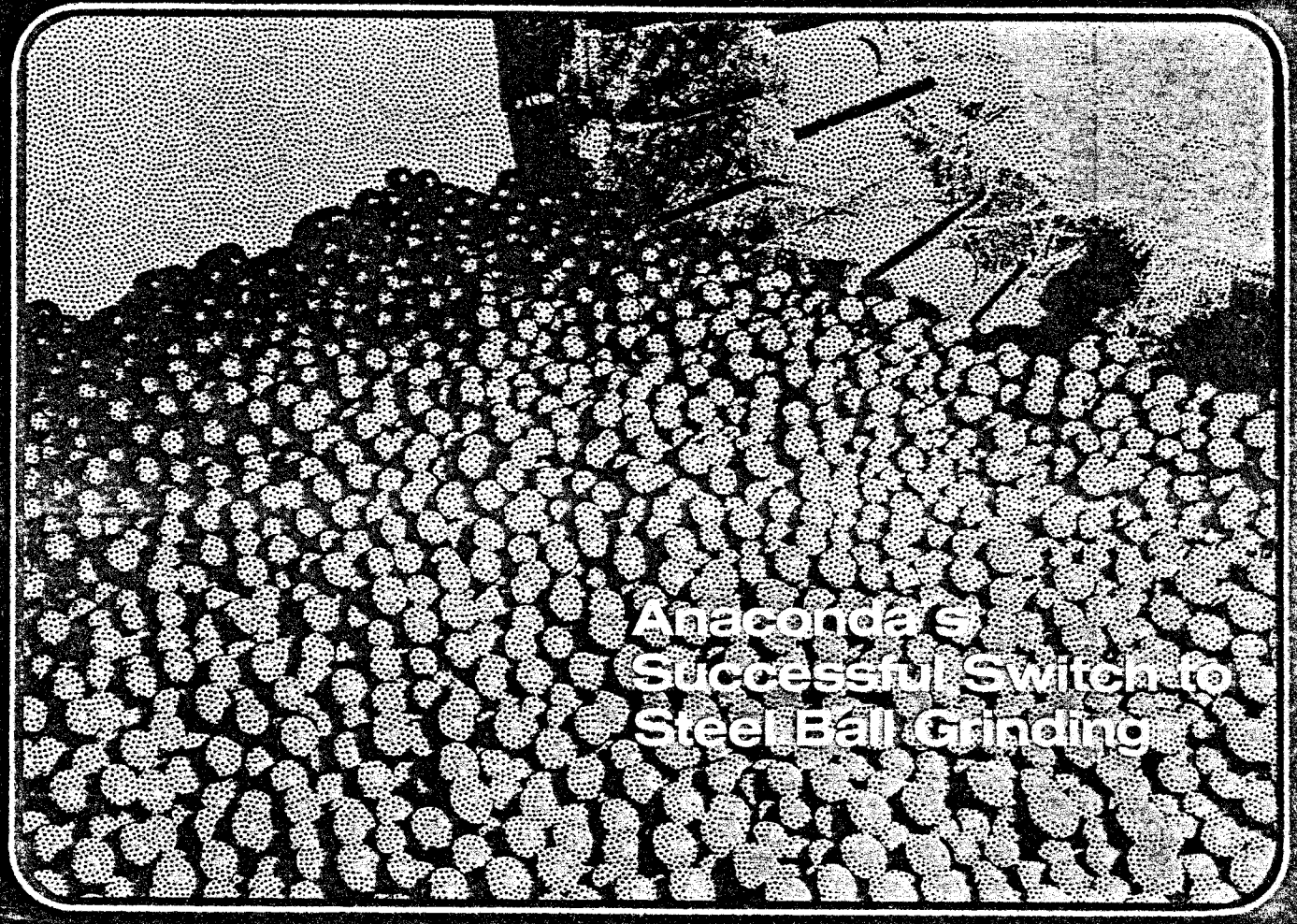


Photograph by Christopher Springmann



MINING ENGINEERING

OCTOBER 1975 A PUBLICATION OF THE SOCIETY OF MINING ENGINEERS OF AIME



Anaconda's Successful Switch to Steel Ball Grinding

How to Predict Coal Mine Roof Conditions Before Mining

Evaluating Mining Ventures Via Feasibility Studies

Off-Highway Trucks: A Guide to Engines and Transmissions

The Greening of the Oquirrhs

more sub-ore zones within an ore interval which will also consume reagents.

As a general principle, it should be anticipated that even after careful geologic and engineering studies, and after months of actual experience in a field, it wouldn't yet be possible to predict leaching rates or total recovery from one block to the next with anything approaching accuracy. For example, one block may yield 120% of the estimated recoverable uranium in three to six months. The adjacent block, although apparently geologically identical, may never yield over 60% of its estimated recoverable uranium, regardless of the number of months it is leached. It is necessary, therefore, to be fairly generous in setting the pounds of U_3O_8 which must be present in a block to justify leaching.

Table 15 gives the details of the capital and operating costs for the third case-history involving the feasibility of extracting uranium values from a given sandstone deposit. Table 16 shows the financial analysis for the project under consideration.

As can be noted, the bore hole mining technique appears to be a very attractive method for extracting uranium from lower grade ores. Even at the old price of $8.00 per lb, the return on investment is 30%. Similarly, the same return is obtainable at $12.00 per lb of uranium with only 35% extraction, rather than the anticipated 70%.

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[3] Hall, Kenneth B., "Homestake Carbon-in-Pulp Process," Presented at local AIME meeting, Lead, S.D., July 1974.

[4] Salisbury, et al, "Silver Recovery From Flotation Trails by Carbon-in-Pulp Cyanidation," Paper presented at the AIME Annual Meeting, New York, February 1975.

About the Authors

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Roshan B. Bhappu is vice-president and general manager of Mountain States Research & Development, a subsidiary of MSME. He holds a D.Sc. in metallurgy and mining and an M.S. in metallurgical engineering from Colorado School of Mines. Before joining MSME, Dr. Bhappu was senior metallurgist at the New Mexico State Bureau of Mines and Mineral Resources, research professor at New Mexico Institute of Mining and Technology, and resident metallurgist at Miami Copper Co. A member of several professional organizations, and extremely active in SME-AIME affairs, Dr. Bhappu is listed in American Men of Science and is a special consultant to the United Nations.

The Greening of the Oquirrhs

Christine Alexander, Environmental Editor

Twenty years ago, the northern Oquirrh Mountains overlooking Salt Lake City were bare. Heavy logging and overgrazing combined with erosion and uncontrolled forest fires had severely denuded the mountains by the turn of the century. As a final coup de grace, a copper smelter was built there in 1906, and for the next 50 years its sulfurous fumes killed off what little vegetation remained.

In 1956, Paul Rokich, a biology student at the University of Utah, started to surreptitiously restore the mountains. For the next 17 years, Rokich devoted his spare time and money to replanting the Oquirrhs, with the result that several thousand acres of the mountains are green again, and animals have returned: deer, elk, and rabbits thrive among olive, maple, and fruit trees, wheat grass, and sunflowers.

Working Alone

For the first four years, Rokich carried out his work without the knowledge of the smelter officials—trespassing on their land in the dead of night to plant experimental plots of grasses and shrubs. He would leave his car where no one could see it, and then hike into

Paul Rokich examines black locust trees growing in the Kennecott greenhouse on the University of Utah campus. The trees will later be planted around Kennecott's smelter in the Oquirrh Mountains overlooking Salt Lake City.

(Left) Under the direction of Larry Jones, Girl Scouts and Brownies prepare soil for planting seeds while their leader and Rokich look on.

(Right) Jones and Rokich observe the European sage thriving in Black Rock Canyon where Rokich planted it years ago while working alone.

Black Rock Canyon, near the smelter, with plants and seeds on his back.

Initially, Rokich had far more failures than successes, but gradually more plants became established, and in 1960, Rokich felt confident enough to bring his work to the attention of officials at Kennecott, who had acquired the smelter from Asarco in 1959. Dr. Robert J. Heaney, head of Kennecott's Utah Copper Division environmental section, liked what he saw and arranged for Rokich to continue his experimental work—but Rokich still had to provide the money for the seeds and plants. During the day he worked in heavy machinery construction to earn the money to support his moonlighting.

For the next decade, Rokich continued to plant with increasing success, but still encountered some failures. He saw a thousand fir seedlings he had planted go up in smoke as a fire started by a careless sheepherder swept the canyon. The hot, dry summers and occasional gully-washing thunderstorms didn't help either, but the experimental plots expanded and gradually crept up the hillside. Also, as new sulfuric acid plants were added at the Kennecott smelter to control sulfur emissions, Rokich found species growing that had previously died, and barren areas showing green again.

In the early 1970's, Dr. Heaney began pushing for a company-sponsored revegetation program, and in the spring of 1973 the Utah Copper Division hired Rokich as an environmental technician.

Working with Kennecott

Rokich teamed up with Larry Jones, a forester specializing in tailings pond stabilization. Together they formulated a comprehensive land improvement program, including reseeding, terrain beautification, tailings stabilization, and dust and erosion control.

During 1974 they seeded 1000 acres of eroded mountain by helicopter, using a special grass mixture developed by Rokich during his years of experimental plantings. After a successful 2-acre experimental planting of Japanese millet on the tailings pond, further acreage is now being planted to control dust. Near Kennecott's Bonneville concentrator, Russian rye has been planted in an attempt to provide a suitable cover with low susceptibility to fire during the critical late summer period. Cost varies, but the team found that they didn't necessarily have to spend a lot of money to get quality: they planted one dump for just $12 per acre.

By some botanists' standards, their methods would be considered unorthodox. "We know the rules," says Jones. "If anyone had told me last year that I would be planting grass in July, I would have called them crazy. But that's what we did and the grass is growing. People say that we aren't following the rules, but the stuff we have planted proves that it grows. . . As far as the rules are concerned, if we're not sure that it will grow, we don't plant it. But if we have a hunch that the plant just might make it, we try. If it grows we look good, if it doesn't, then we find out why. We learn both ways."

Community Involvement

Rokich and Jones are also successfully involving local people in the revegetation program. They have started a project called "tailgate ecology," where they drive to local schools with a pickup truck partially loaded with soil and a supply of seeds, shrubs, or trees for the students to plant in containers. The planting takes place on the end of the truck—hence the name. The students can then watch the plants grow and later help transplant them onto Kennecott property. The plots are then named after the school that did the initial planting.

Boy Scouts have also helped plant trees on a flood-control dike immediately behind the smelter, and Girl Scouts and Brownies have spent Saturday mornings planting 3600 shrubs and 700 trees in milk containers and special nursery plots for later transplanting to revegetate the mountainside.

The Mountain Will Bloom

The many years Rokich spent working alone have at last paid off. When he began, he was considered crazy by some people. "They were sure nothing would grow," says Rokich. But now with Russian olive trees, wheat grass, elderberries, maple trees, mountain mahogany, sunflowers, iris, fruit trees, and many other native and exotic species growing, no one says that any longer. Rokich predicts that after Kennecott's pollution control program is completed in 1977, "the mountain will take off; it will bloom like a rose."

But some people still show disbelief when they hear about the project. "The excuses people make really get to me sometimes," explained Rokich. "If it's growing they say 'Well, the smoke doesn't blow this way anymore' or 'The plants are mutants.' The smoke is still there, but the emissions have been reduced. And as for the plants, it takes 500 years for a mutant to become dominant."

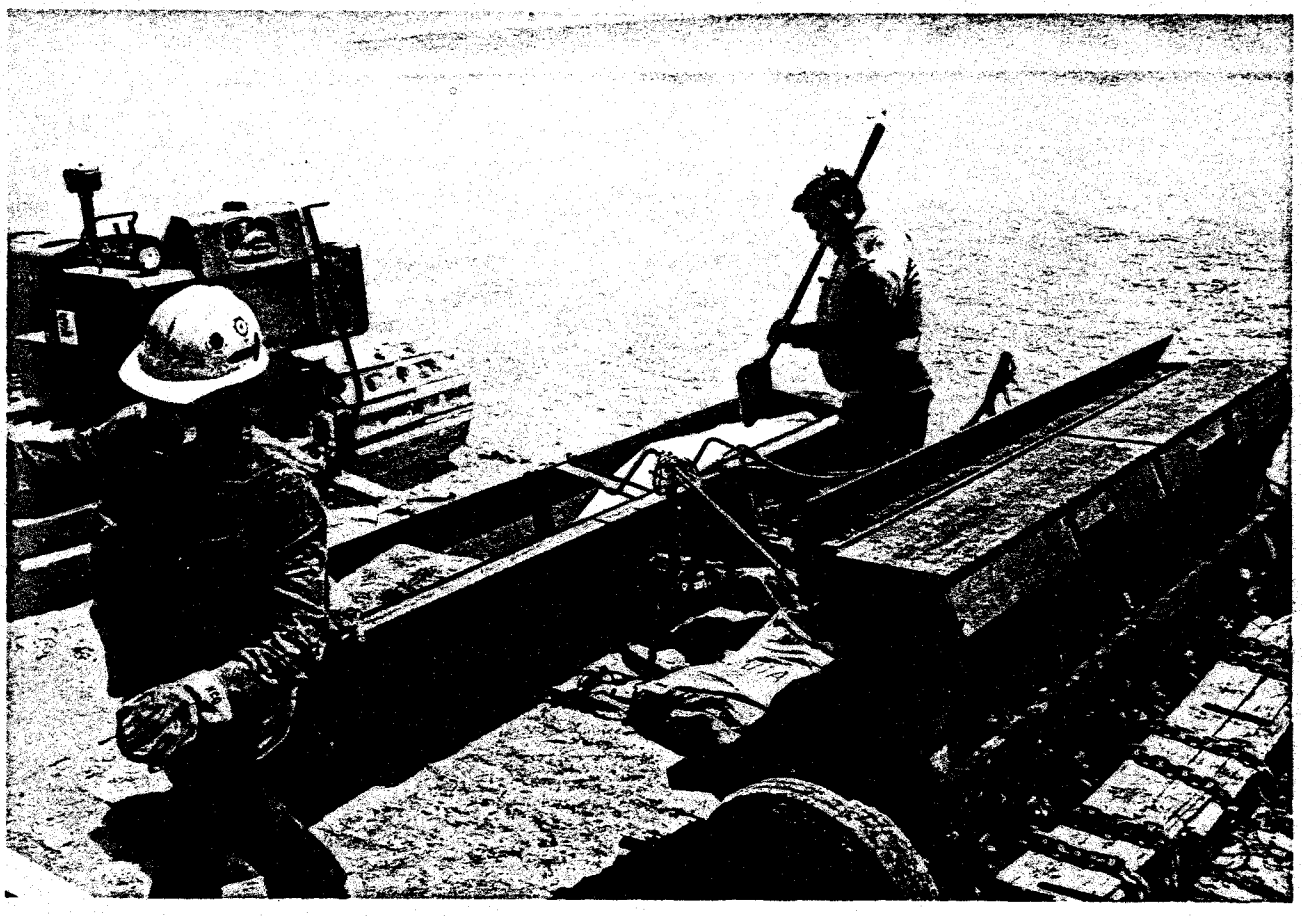
In December 1974, Paul Rokich received the Nature's Trustee Award of the Utah Environment Center in recognition of his outstanding work.

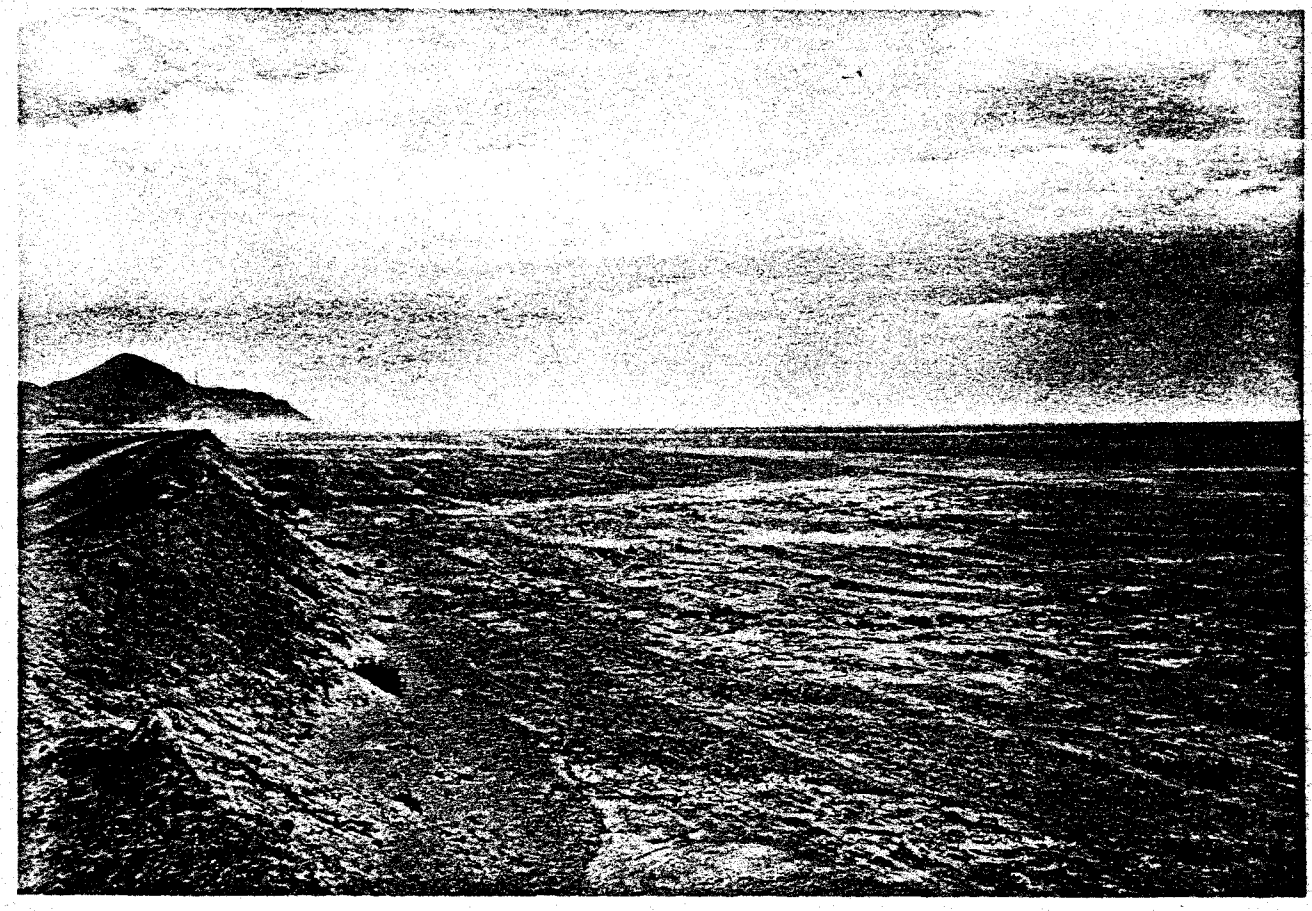
Exhibit XXIX

Japanese Millet Project

One phase of the revegetation program, the planting of Japanese millet on the surface of the tailing pond, was reviewed during the fall of 1975 in a report for the Corporate Office. Several tours, including groups from the League of Women Voters and the Utah Seed Growers Association visited the revegetation program during the fall and saw the millet project.

The following photos show the planting of the millet, the contrast in the dust problem between planting day (top) and maturity (bottom), the millet as a crop, and the League of Women Voters' tour.





Japanese Millet Project

One of the first revegetation projects initiated by the Utah Copper Division revegetation team--Larry Jones and Paul Rokich--hired in May 1973 was the planting of Japanese millet directly on the surface of the tailing pond to control dust. Jones had done a Masters Degree at Michigan Technological University on stabalizing tailing ponds and had worked with Japanese millet for his thesis project. Rokich had an 18-year background of experimental planting in the area.

The initial planting in June 1973 was a two-acre experimental plot planted on a beach along the eastern end of the southern tailing pond dike just opposite the Copper Golf Club in Magna. The millet seed was drilled into the tailing material and fertilizer was added as follows: 66 pounds of nitrogen, 72 pounds of phospherous, and 30 pounds of potassium as available nutrients per acre. The millet, watered by the moisture in the tailing material beneath the surface, grew to a height of 18 to 30 inches and did an excellent job of controlling wind-blown tailing.

So successful was the project that plans were made to plant 300 acres in 1974. However, due to a number of problems (equipment breakdown, lack of fertilizer available at the right time, inadequate beach areas for planting), the millet was never planted. Seed and fertilizer was carried over to the 1975 season.

When the 1975 season arrived, equipment was once again lacking, and the cold wet spring delayed planting. It was mid-June before the millet seed was drilled into the tailing material, deep so surface temperatures from the sudden summer wouldn't burn the germinating plants. Fertilizer was again

applied in the amounts given above.

Two plots were planted: a 12-acre area on the eastern end of the southern part of the pond (identified as the Magna Plot) and a 20-acre area just across the highway from the Arthur Concentrator. A wide-tracked vehicle was leased to pull the grain drill, but even so, the surface of the tailing pond was so unstable that the machinery bogged down several times on the northern side of the planting route, limiting the area to be planted.

The Magna Plot was planted on a windy day with much dust blowing, but it grew well, reaching a height of 15-20 inches throughout most of the area and up to 30 inches along the northern loop where more moisture was available. It held the dust well.

The Arthur Plot, however, was for all practical purposes a total failure. Through lack of coordination, the 20-acre plot was coherixed a few days after it was planted, and shortly thereafter, it was flooded with new tailing material so that very little millet grew and none of it more than a few inches high.

In early October Bob Entzminger of the U. S. Forest Service's Surface Environment And Mining Program (SEAM) visited the Division's revegetation program and toured millet project. It was a terribly windy day, and dust was blowing everywhere, everywhere except on the surface of the 12-acre Magna Plot where the dust was held by the millet, by now cured to an autumn tan.

October 3, 1975

Dear Mr. Rokich,

I made my meeting yesterday with 5 minutes to spare! Thank you so much for arranging the helicopter ride down from the peak - which put the finishing touch to my view of the area - and for the loan of your car. Hope you found the car all right.

I've decided Coon canyon is the most beautiful spot in Utah. I'm glad you are going to be able to preserve it.

Sincerely,

Lois Frederick

Exhibit XXX

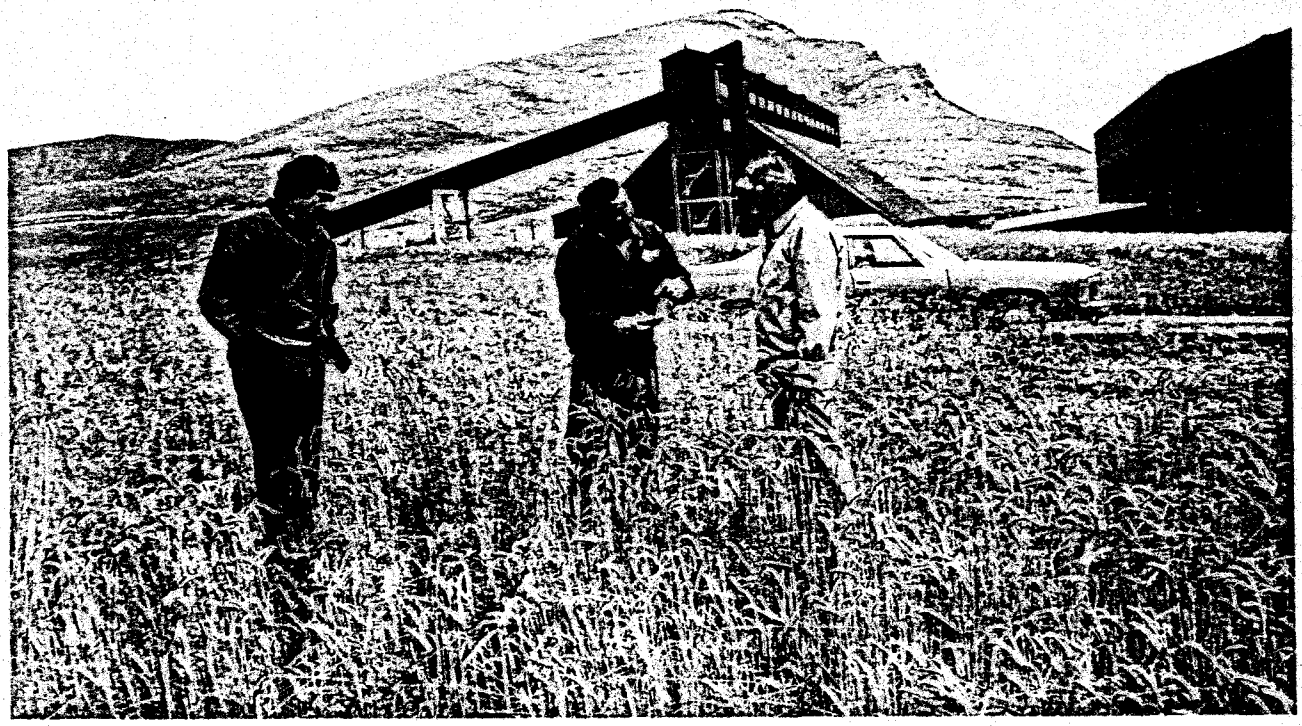
Robert Entzminger Tour

One of the officials in the Forest Service's Surface Environment And Mining (SEAM) Program is Bob Entzminger, formerly in the Ogden office of the Forest Service as a public information officer. Learning of the Kennecott revegetation efforts, he asked to visit the program, which he did in the fall of 1975.

One of his comments after seeing the various projects was that "what everyone is talking about doing in the way of revegetation, you guys are actually doing."

The basic philosophy of the revegetation team has been set forth in a brochure developed by the Communications Department as a hand-out to accompany a display also developed by the Communications Department to exhibit the revegetation program at conferehces and conventions. A copy of the brochure follows photographs that capture the essence of the Entzminger tour.

"It's easier to change the soil than it is to change the climate," says Rokich, "but you don't have to change either one if you get the right plants." And that's what 20 years of experimental planting and species testing by Rokich has been trying to do: find the right plants, an answer that may have widespread application throughout the Arid West as surface mining reaches into more and more areas including those administered by the Forest Service.



The revegetation program launched by Kennecott's Utah Copper Division in the Spring of 1973 is restoring the appearance of the north Oquirrh Mountains.

Success of the program is due in part to greater capture of smelter process sulfur oxides which enables native vegetation to return. So, the revegetation efforts are having a noticeable effect on the thousands of acres owned by the company.

Designed for long range improvement of watershed and wildlife habitat, dust and erosion control, and to dress up the face of the land, the program becomes multi-faceted. New patterns of plant succession are being developed to assure reclamation through self-perpetuating plants responding to gradual improvements in the environmental conditions.

The concepts being applied here may be the basic answer to recovery of large areas throughout the arid West. The revegetation program is experiencing excellent results from an investment of only $200 to $300 per acre — and with no more rainfall than more expensive programs.

. . . the right plant . . . the right season

The secret to revegetation lies in selecting the right species and in planting them at the right time. Most of this locale gets limited rainfall in the late fall, snow in winter and more rain in early spring — hardly any moisture during the growing season. Drawing upon twenty years of experimental planting for its species selection, Kennecott has adapted the right species to a fall-planting schedule for a successful establishment of plant growth. The planting of native species or exotic plants with similar life cycles in the fall gives them the benefit of most of the year's moisture — greatly increasing the chance for success.

. . . from barren slopes to mountain greenery

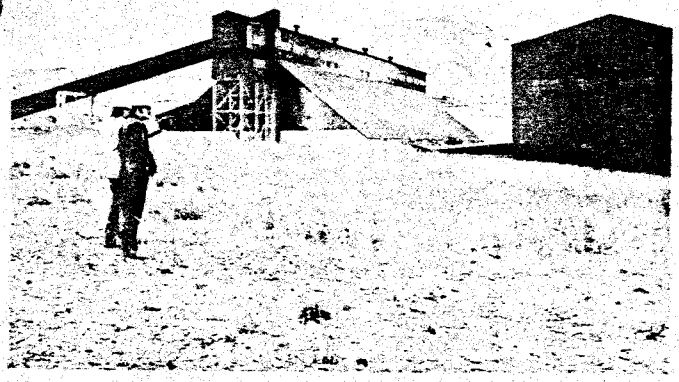
Throughout the north Oquirrhs where combinations of logging, overgrazing, fires, and finally, smelter emissions have been denuding the hills, specific variations of the "right plant, right season" technique have been applied toward revegetating sparse and barren landscapes. Aerial seeding of grasses broadcast by helicopter during April when the snow still lay deep on the north slopes; deep drilling of Japanese millet on the tailing pond surface in June; and seeding of a rocky field in September with no rain in sight were resolute applications to be sure. But, in each case, the plantings have been highly successful.

Black Rock Canyon near the smelter has been the experimental plot for Paul Rokich, Kennecott environmental technician, for twenty years. Once a mini-moonscape — before sulfuric acid plants captured the process sulfur oxides — this canyon is now being restored to lush mountain beauty.

. . . today's success . . . tomorrow's promise

The re-greening efforts are not limited to Black Rock Canyon or the tailing pond and dike even though success is measurable in those areas. Little Valley, near the Bonneville Concentrator, sports grasses stirrup-high to a tall horse and nearly 100% success for a major tree-planting program. Hundreds of junior and senior high school students participated during Earth Week in that project. Grade school youngsters get involved also in the division's innovative "Tailgate Ecology Program."

Attesting to the success of the effort, wildflowers abound in the hills where deer and elk, rabbits and chukars thrive. Coyotes have returned to roam the north Oquirrhs again, and golden eagles can be seen soaring and wheeling over the smelter stacks. More importantly, the basic health of the land is returning, and establishing a vital ecological balance which promises to endure.



Although the revegetation program is still an infant, the background has been laid for a sound and lasting future for the activity. The tree farm nurtures 10,000 shrubs and trees. Larry Jones, the revegetation team forester, has plans for a seed farm to stock grasses and browse species.

Throughout the area, plants are awaiting another season of moisture. With the huge emission control project moving nearer to completion, revegetation efforts continue to hold promise for Kennecott property in the Oquirrh Mountains.

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